Volume XVI.
Number 6.

JUNE, 1899.

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Directory

...OF THE...

Textile Trade

For 1899-'00,

400 pages with 19 maps is ready this month.

See page 27.

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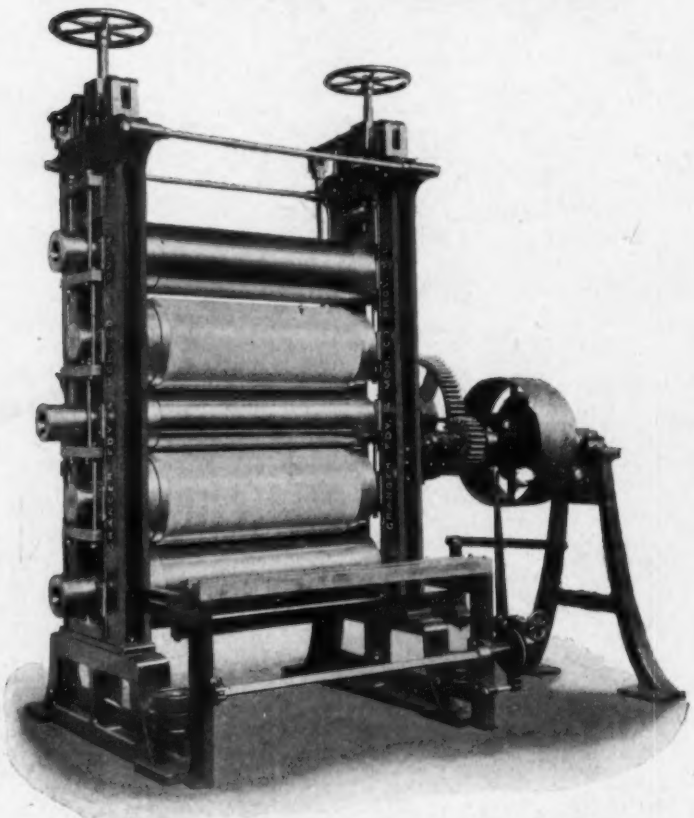
GUILD & LORD,
PUBLISHERS.

620 ATLANTIC AVENUE,
BOSTON, MASS.

Bleaching, Dyeing, Drying,

And Finishing Machinery.



CALENDARS, MANGLES AND ROLLS.

TENTERING MACHINES,
MERCERIZING MACHINES.

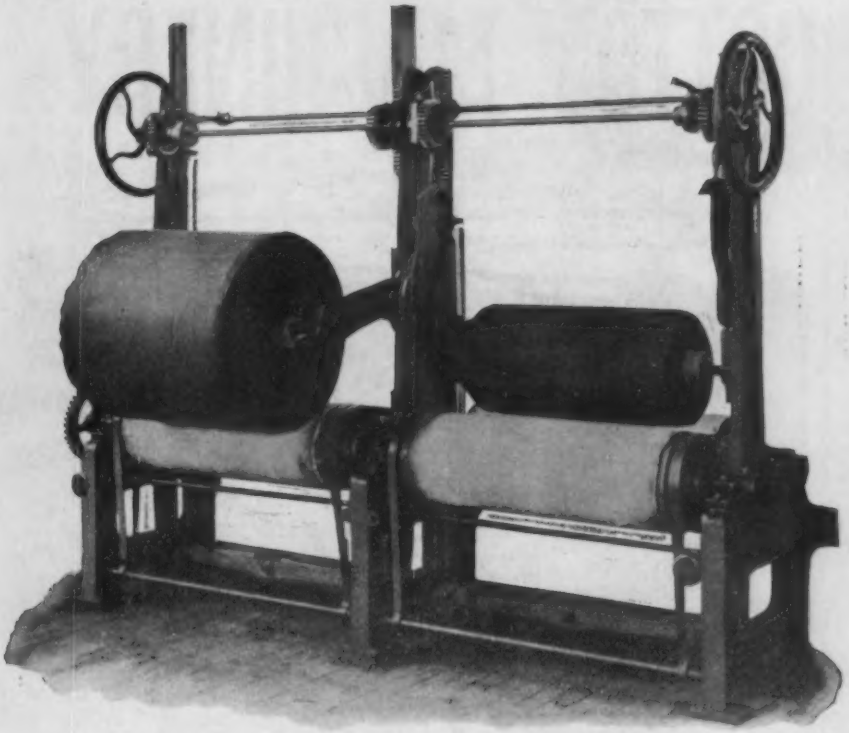
Granger Foundry and Machine Co.

PROVIVENCE, R. I.

BLEACHING, PRINTING, DYEING AND FINISHING

MACHINERY,

For Textile Fabrics



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W. P. SIMPSON, Patentee.

FOR USE IN CONNECTION WITH

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No stoppage or even "Slacking up" of the machine is necessary.

Cutting is done close to the seam, thus eliminating waste.

As creased ends are avoided at beginning and end of roll, no refinishing is necessary.

One man can attend two or more Winders, as the new roll is started automatically, and completed roll can be removed at convenience.

H. W. BUTTERWORTH & SONS CO.

PHILADELPHIA, PA.

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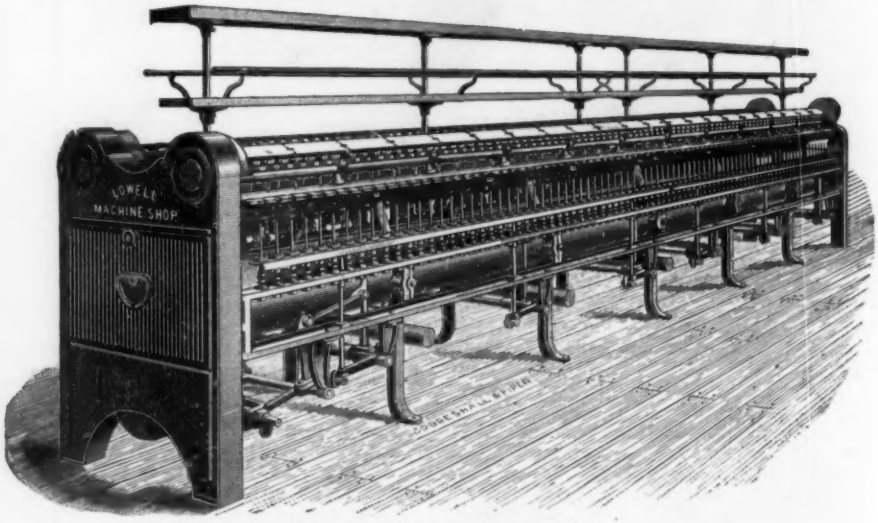
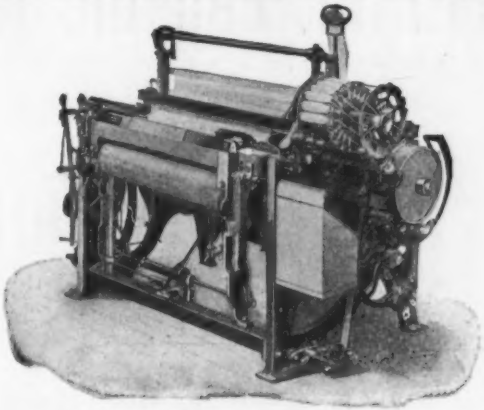
Lowell, Mass.,

COTTON MACHINERY.



Revolving Flat Cards,
Railway Heads,
Drawing Frames,
Roving Frames,
Ring Spinning Frames,
Twisters, Spoolers,
Warpers, Slashers,
Looms.

WORSTED MACHINERY.



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Business is Improving.

MANY cotton mill managers will, therefore, conclude that they can possibly have a chance to run their old machinery at a profit instead of facing a daily loss.

SHOULD they fail to meet the increased demand by improving their facilities with **new machinery**, they will soon realize that the chance of a profit will bring the competition of **new mills** that will start with the latest and best equipment.

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HOPEDALE, MASS.

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Long Chain Quilling Machines,
Wet and Dry Twisters,
Looms,

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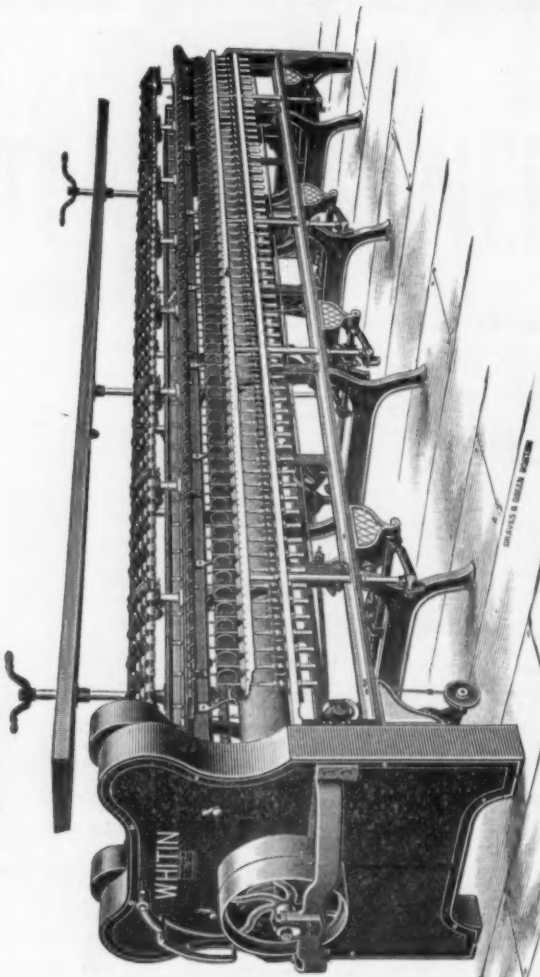

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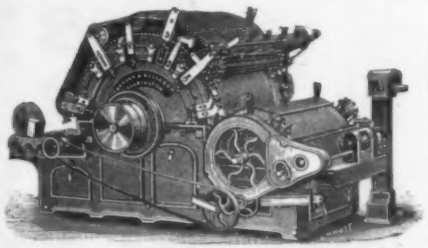
S. W. CRAMER, Southern Agent.



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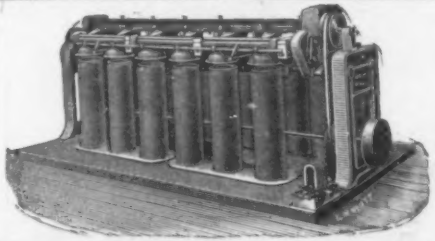

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Slubbing, Intermediate, and Roving Machines.

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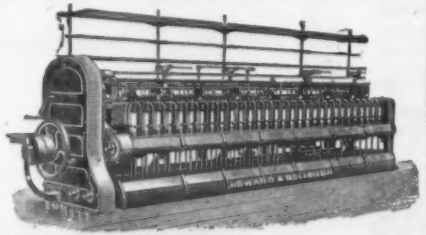

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for WOOL, SHODDY, and COTTON, is

Second to None

on the market. It holds more stock, requires less space, and needs no "attachments."

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Spinners of Worsted Yarns. Mixes and Fast Colors Specialties.
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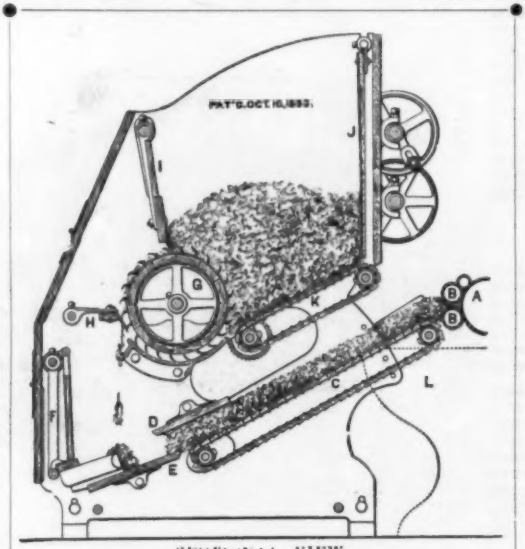
WOONSOCKET WORSTED MILLS,
EDWIN FARNELL, Agent.



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It is built in all sizes and guaranteed as represented.

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Worsted Yarns.
C. T. Crocker, Pres. C. B. Smith, Treas.

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Woonsocket Machine and Press Co.,

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Yours respectfully, STAR WORSTED COMPANY,
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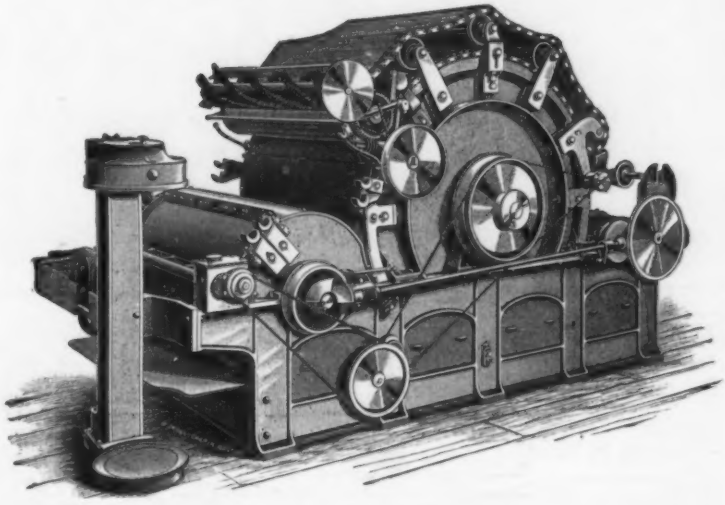

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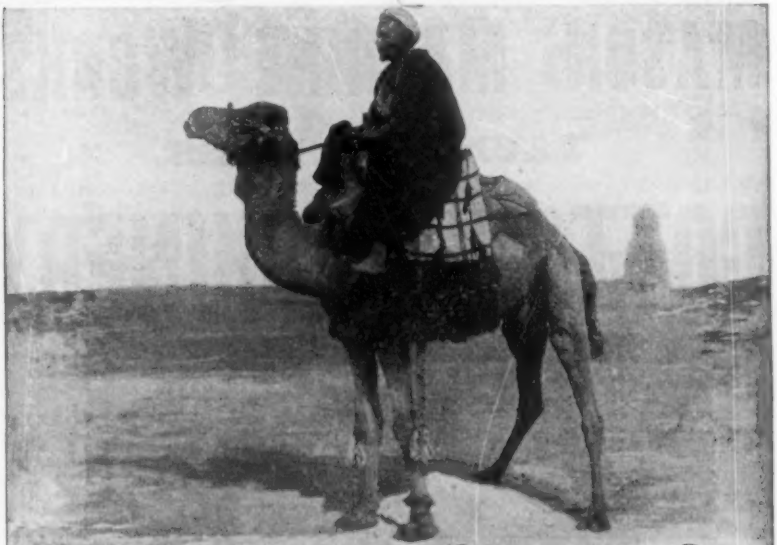

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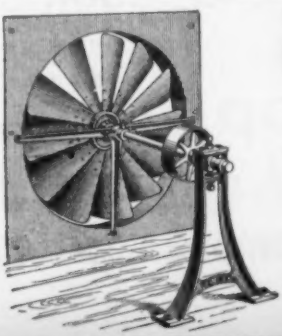

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For Cotton Stock, Wool, Yarn, Etc.
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BEST in Construction, LOWEST in Price.
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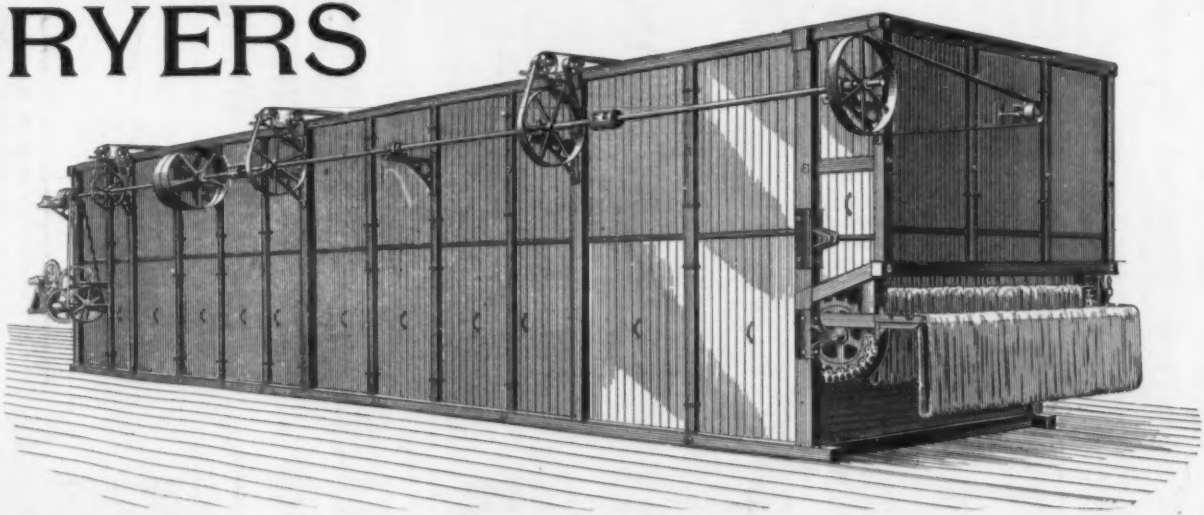
For WOOL, COTTON STOCK, YARN, HOSIERY and UNDERWEAR.



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for Moistening the Air, and Maintaining a Proper Condition in the Various Departments of Textile Manufacture, Printing Offices, Tobacco Works, Leather Factories, and all places where Artificial Moisture is desired.

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That Humidifiers Pay cannot be doubted, but they do so only under conditions where a judicious selection is made of the system, and special attention given to construction and installation; otherwise, mill owners find to their cost that their outlay is so much money thrown away. We have known many instances of humidifier installations which, after a short trial, have been found to be utterly unserviceable, and have had to be discarded for others. This is really to be attributed either to insufficient attention being given to the selection, or to the desire for cheapness, which causes mill owners to buy one of the low-priced and inferior devices.

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In Carding Rooms: The advantage of putting humidifiers in carding rooms is chiefly experienced in connection with the cards and drawing frames. Troublesome electricity will be destroyed, and the roving will run more even. Though it is not possible to give any exact figures as to the amount of economy, it has been proved that a great saving is effected by the use of humidifiers in connection with slubbing, intermediate, and roving frames, especially where low grades of cotton are used.

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Our System consists in placing at intervals about the room a number of "humidifiers" connected with feed and return pipes, which are supplied with water under pressure. Their function may be said to be two-fold: (1) *to dispose into the atmosphere a quantity of water, infinitely pulverized, sufficient to fill with moisture the spaces of air between them; and* (2) *to induce the higher strata of air in the room into the body of the humidifier through the upper portion, and to expel it, charged with vapor, through the circular base, thus covering a larger area, and keeping the air of the room in continual circulation.* By this double but simultaneous action, the following results are achieved: **You humidify the air; you wash it of all impurities; you vivify it in its transit through the body of the humidifier by depriving it of some of its carbonic acid gas; you destroy the atmospheric electricity; and, in addition, a considerable change in temperature can be effected by disposing cold or hot water from the humidifier.**

No Special Attendance Necessary for the Maintenance of the System.
Increases Production, Destroys Troublesome Electricity.

In addition to the facilitation and improvement of the various processes of manufacturing which the use of humidifiers accomplishes, there is another consideration which should weigh with all manufacturers, viz.: the benefit to be derived from the system by their workpeople.

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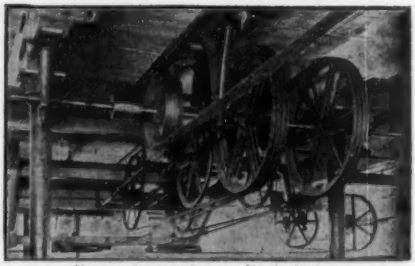

View of two 20 h. p. Rope Drives in yarn mill of W. H. GRUNDY & Co., Bristol, Pa.

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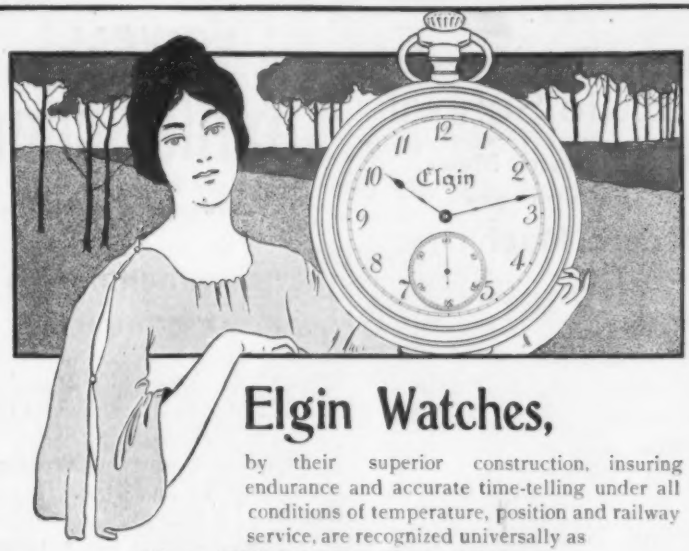

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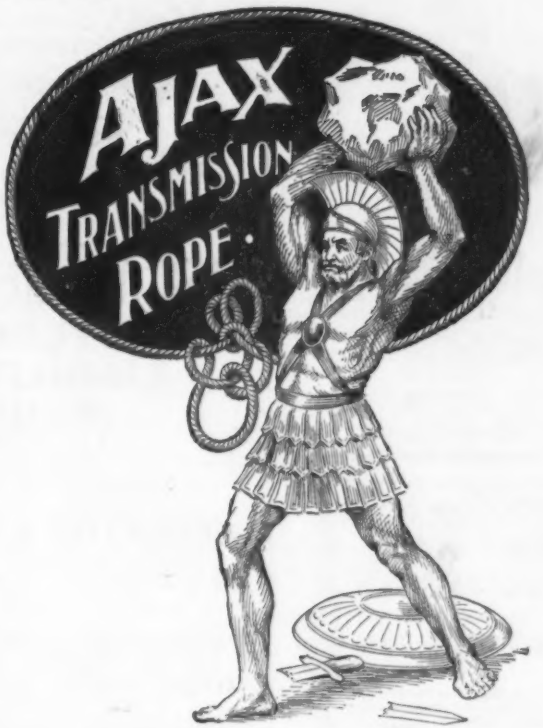

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Mail spindle, bobbin and sample of strongest yarn you make and we will fit one to spindle and return free of charge.

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HENRY G. KITTREDGE, Editor.

PUBLICATION AND HEAD OFFICES:

BOSTON: - 620 ATLANTIC AVE.

PHILADELPHIA OFFICE,

THE BOURSE.

NEW YORK OFFICE,

140 Nassau Street.

Subscription Price.

$2.00 per year for U. S. and Canada.
2.50 per year for Foreign Countries.
3.00 per year with Dyer's Supplement.
(Postage is prepaid by publisher.)

Remit by Express Money Order, Draft, Post Office Order or Registered Letter.

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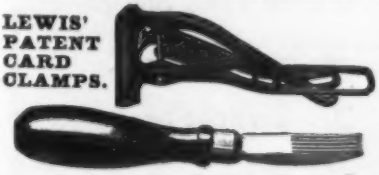

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George W. Gregory, in November, 1874, resigned his position as Principal Examiner U Patent Office to enter the firm.

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HOPEDALE, Mass., January 2d, 1899.

Mr. George W. Gregory, of Crosby and Gregory, has taken out for us since January, 1875, more than two hundred patents. GEO. DRAPER & SONS.

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List of Textile Patents.

Issued April 25, May 2, 9, 16 and 23, 1899.

Card-Grinder. 625,706. Lewis P. Sherman, Biddeford, Me., assignor to Richmond H. Ingersoll, same place.

Cloth Drying Apparatus. 625,169. James S. Johnston, Utica, N. Y.

Cloth, Apparatus for Pressing and Shrinking. 623,648. Carl H. Behnisch, Luckenwalde, Germany.

Circular Knitting Machine. 623,539. Ashley J. Gulich, Clearfield, Penn.

Cloth Cutting Machine. 624 704. Wilhelm Tharaudt, Berlin, Germany, assignor to Philippsohn & Leschziner, same place.

Combined Tension Mechanism and Slack-Thread Controller. 625,579. John Maitland, Cohoes, N. Y., assignor of one-half to William Beattie, same place.

Cotton Conveyer. 624,237. Roscius C. Newell, Palmer, Mass.

Doffer Driving Mechanism for Card-ing Engines. 523,950. Joseph Eaton, Taunton, Mass, assignor to the Mason Machine Works, same place.

Dyeing Machine. 625,357. Charles Schlaepfer and Matthew Walton, Fratte di-Salerno, Italy.

Fiberless Thread, Process of Manu-facturing. 625,033. James F. Hoy. e, New York, N. Y.

Hackling and Ending Flax, Machine for. 625,036. Robert W. Knox, Kilbirnie, Scotland.

Jacquard Machine, Double Action. 625,563. Albert E. Kelmel, Providence, R. I., assignor to the Crompton & Knowles Loom Works, Worcester, Mass.

Jacquard Machine, Double Action. 625,562. Albert E. Kelmel, Providence, R. I., assignor to the Crompton & Knowles Loom Works, Worcester, Mass.

Jacquard Machine, Double Action. 625,476. George W. Stafford and Albert E. Kelmel, Providence, R. I., assignors to the Crompton & Knowles Loom Works, Worcester, Mass.

Jacquard Machine, Double Action. 625 208. Geo. W. Stafford and Albert E. Kelmel, Providence, R. I., assignors to the Crompton & Knowles Loom Works, Worcester, Mass.

Knit Boot. 625,331. R. Heaton, Sandy Hook, Conn., assignor to U. S. Rubber Co. of New Jersey.

Knitting Machine. 625,234. John Adams, Philadelphia, Pa.

Knot Tieing Device for Spooling Machines. 623,925. Thomas McVeigh, Danielson, Conn., assignor of one-half to the Draper Company, Portland, Me., and Hopedale, Mass.

Knitting Machine. 624,065. William S. Mills, Bridgeport, Conn.

Loom. 624,197. Willie G. Eaton, Nashua, N. H., assignor to the Draper Co., Portland, Me., and Hopedale, Mass.

Loom. 624,371. James H. Northrop, Hopedale, Mass., assignor to the Draper Co., Hopedale, Mass. and Portland, Me.

Loom Picker. 625 620. Frank A. Wardwell, Methuen, Mass.

Loom, Let-off Mechanism for. 625,206. O to W. Schaum, Philadelphia Pa.

Loom. 623,951. Willie G. Eaton, Nashua, N. H., assignor to the Draper Company, Portland, Me, and Hopedale, Mass.

Loom. 623.604. Eduard Herzig, Union Hill, N. J.

Lustering Machine. 624,884. David Welsh, Providence, R. I., assignor of two-thirds to Walter Rushton, same place.

Looms, Jacquard Mechanism for. 625,297. Frank Fowler, Philadelphia, Pa., assignor of three-fourths to Geo. D. Bromley, same place.

Lease Rod. 624,658. Harold Kelly, Biddo d, Me., assignor of one half to John P. Kelly, Saco, Me.

Looms, Warp Stop Motion for. 625,157. John C. Edwards, Brookline, Mass.,

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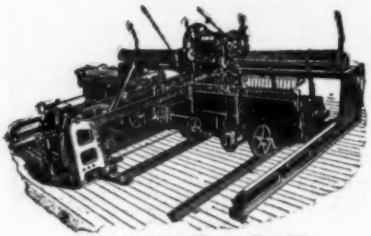

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assignor to the Draper Company, Portland, Me. and Hopedale, Mass.

Looms, Warp Stop Motion for. 625,191. James H. Northrop, Tustin, Cal., assignor to the Draper Company, Portland, Me. and Hopedale, Mass

Loom, Warp Stop Motion for. 624,155. W. H. Baker and F. E. Kipp, Central Falls, R. I. and Montclair, N.J., assignors to Kip-Armstrong Co. of New York.

Loom Warp Stop Motion. 624,252. Edward A. Robinson and Victor Piron, Lowell, Mass; said Piron assignor to said Robinson.

Loom Warp Stop Motion, Electrical. 624,154. William H. Baker, Central Falls, R. I. and Frederic E. Kip, Montclair, N. J., assignors to the Kip Armstrong Company, New York.

Mercerizing Machine. 624,800. Eduard Heberlein, Wattwil, Switzerland.

Rags, Apparatus for Disintegrating and Washing. 625,311. James H. Annandale, Polton, Scotland.

Ribbon Cutting Machine. 623,900. Solomon Gottschall and Henry Kamsler, New York, N. Y.

Ring Spinning and Doubling Frame Traveling Mechanism. 624,738. Philippe Bazin, Conde-sur-Noireau, France.

Ring Spinning and Twisting Machine. 625,373. Richard McCarthy, Central Falls R. I.

Shade Finder. 624,331. George K. Henderson, Coshocton, Ohio.

Spinning Frame Attachment. 624,148. Andrew C, Allgood, Henderson, N. C.

Shuttle Tension Device 624,670. Joseph Nuver, Paterson, N. J., assignor to Isaac A. Hall, same place.

Silk Fabrics, Manufacturing of. 625,120. Joannes Ollagnier, Marius Fructus, and Eugene Descher, Lyons, France.

Spindle Bearing. 625,154. George C. Drape , Hopedale, Mass., assignor to the Draper Company. same place and Portland, Me.

Spinning Mule. 624,939. William Howard, Woonsocket, R. I., assignor of one-half to Edward Hilton, same place.

Swivel Loom. 624,039. George F. Hutchins, Worcester, Mass., assignor to the Crompton & Knowles Loom Works, same place.

Thread Carrier for Braiding Machines. 623,514 Eusebio F. Cabezola, Trenton, N. J.

Thread Carrier for Braiding Machines. 623,514. Eusebio F. Cabezola, Trenton, N. J.

Tension Wire and Bobbin Brake for Warpers, Automatic. 624,695. Thomas H. Smith, Jamestown, N. Y.

Textile. 623,842. George R. Shevill, New York City, assignor to Mary E. Shevill, same place.

(Continued on page 138)

BENJAMIN ALLEN

TEXTILE WORLD.

Vol. XVI. JUNE, 1899. No. 6.

BENJAMIN ALLEN

The manufacturing community, in the knitting industry, were shocked to hear of the death of Benjamin Allen, last month, one of the members of the firm of J. & B. Allen, Germantown, Penn.

Mr. Allen was born in Nottingham, England, May 22, 1831. At the age of twelve years his mother and father came to America with their family, and settled in Germantown. One year after, in 1844, William Allen commenced the textile business in lower Germantown, the sons assisting the father in the business, which developed into one of the most prosperous in Germantown. The following year the father sent to England for two handframes and started business in a very modest way. The two boys were as full of energy as the father, and in a little while they found themselves working all day and late into the night making stockings and knit goods. The profits were small, but there was a ready sale for all the goods that they could make. The business gradually increased, other machines and handframes were imported, and in 1851 the business was moved to its present location on Wister Street. The father retired from business in 1864, which was then conducted by his two sons, John and Benjamin. The father died in 1877.

In 1861 a New York branch, under the supervision and direction of John Allen, was opened, which grew to large proportions, necessitating his supervision for nearly twenty years. Benjamin in the meantime had the care and direction of the factory in Germantown, which continued to grow, necessitating new buildings from time to time. After some years both members of the firm were needed in Germantown, the outside business being put in charge of trusted employees. The line of goods embraced fancy knit fabrics of all kinds, and sales were made in every State in the Union.

Benjamin Allen was from boyhood active and prominent in everything that he went into. When a young man he was a member of Captain Miles' Germantown Blues, and always took a pride in being prompt and faithful on all occasions. He was also a leading cricketer in years gone by, when the English handframe weavers and mill hands had their matches in lower Germantown. Being strong and active he was a good bowler and a sure run getter. The proprietors of the mills in those days took a pleasure in engaging in athletic sports with their workmen, as was the custom in England before the Allens came to America.

Mr. Allen always had a love for music, which had a charm for him, and which he cultivated, and was a pleasure to him all his life. When quite young he and some other young friends organized the Germantown Cornet Band. The band was regularly called on for church fairs and entertainments for some years. All his life he had a fondness for books, which gave him a fund of information that served him well as he grew older. He read for general culture, and he read systematically, and he was looked upon as he grew older as being one of the best posted men on general subjects in the community. His knowledge of books gave him a command of

language and facts that made him an interesting talker on nearly all subjects.

Being a staunch Republican, Mr. Allen was an active member of the Manufacturers' Club and the Union League of Philadelphia. While always active in politics, he was content to use his best efforts for the good of the city, the State and the nation, refusing from time to time to accept any political gift at the hands of his friends. During the War of the Rebellion he was among the foremost on all committees which had for their object the care of the soldiers and the soldiers' widows and orphans. When it was proposed to erect a monument to the soldiers in Germantown he was selected as the president of the Citizens' Committee, which raised the necessary money.

Mr. Allen was for many years a director of the National Bank of Germantown, director of the Penn Mutual Insurance Co., Mutual Insurance Co. of Germantown, Manufacturers' Club, Vice-Pres. of "Society of the Sons of St. George," member of the Union League, and other clubs and institutions.

COTTON.

The Agricultural Experiment Station at Clemson College, S. C., has made a report upon certain experiments with eighteen varieties of cotton that were planted a year ago and gathered last fall, for the purpose of comparing them, as to earliness of maturity, yield and quality of lint. The character of some of these experiments is particularly interesting, as showing the comparative value of some well known varieties of cotton, especially those that have recently come into public notice.

What few words we have to say at this moment may be taken in connection with an article that appears elsewhere in this issue, on "Recent Experiments in Cotton Culture." One of the varieties experimented with (Jackson's limbless cotton), we desire to call attention to, and to the record it has made, showing that this is really a valuable variety, notwithstanding the immense amount of humbuggery and falsehoods that have been associated with its origin, etc. Many of those engaged in the cotton business find it impossible to separate the false statements concerning this variety from its undoubted merits; and many of the condemnations which it receives are due to a prejudice thus created.

The one that made the experiments at the agricultural station says, "While the Jackson is not absolutely limbless, it seems to be entitled to the name, since 64 per cent. of the stalks were limbless, and many of those classed as having limbs did not bear the limbs as other varieties had, but bore somewhat the appearance of suckers, or adventitious limbs." The yield of lint per acre for the Jackson variety did not show comparatively well, being but 473.71 pounds, against the highest yield of 686.07 pounds; but the per cent. of lint of seed cotton was good, ranking third in this respect, or showing a yield of 34.6 per cent., against the highest of 37.6 per cent. Other recorded experiments have been made with this cotton, and incorporated in the report of the South Carolina Agricultural College. One of these outside experiments was made at Hartsville, S. C. showing in a test of four varieties a yield for the Jackson cotton of 498.32 pounds, with 37.33 per cent. of lint, being the highest in the list.

Major Harry Hammond, Beach Island, S. C., well known in that State, also conducted certain tests of eight varieties of short stapled cotton, in which the yield per acre was very much to the advantage of the Jackson variety; so much so, that Major Hammond commented upon it to the effect that he regarded it "a good variety," and he further makes the statement that, in his belief, it is not the same as the Jeff Welborn variety, with which many associate it, seemingly forgetting that if it is the same as the latter, it naturally would be one of the best varieties grown in the South.

THE 1899 DIRECTORY.

The Textile World's Annual Directory of the Mill Trade for 1899 is published this month and is being delivered as rapidly as possible to those entitled to receive it. The work of delivery takes several weeks.

Each year's experience makes it more comprehensive and accurate, and each month seems to add to its popularity. The 1898 edition has been exhausted for several months. This directory is today, we are confident, in more general use than any other.

The feeling of doubt that a complete directory could be furnished free to the subscribers of the Textile World at $2.00 per year, has given way to confidence that not only is it done, but that we give the best Directory of the Trade, regardless of price. We challenge comparison.

This success would not have been possible without the cordial co-operation of the manufacturers who have given us every assistance in furnishing information, so that this is really an Official Directory.

This year the flexible covered edition is sent out looped for hanging up, and we trust it may be given a convenient hook for ready reference near every mill man's elbow.

Several improvements in arrangement have been adopted and its usual features of excellence have been maintained. Several hundred new mills have been added and many have been taken out. Hardly a mill but had some changes to report. There have been few years in which there have been so many important changes to chronicle, so that those having to do with the mills, need the new Directory more than ever.

The Table of Contents is as follows:

Part I. Directory of all Textile Establishments in the United States, giving the following information about the mill: Name of company or concern, capital stock, officials' names, agent, superintendent, class of goods made; the machinery equipment, that is, cards, spindles, looms, knitting machines, etc., steam or water power, if there is a dye house, names of selling agents, and in many cases, the name of the buyer.

The mills included are cotton, woolen, worsted, knit, silk, flax, jute and linen; bleaching, dyeing and finishing establishments and wool scourers.

Part II. Manufacturers' Selling Agents, and Dry Goods Commission Merchants. Manufacturing Clothiers buying from the mills. Suit and Cloak Manufacturers buying from the mills. Jobbers and Large Buyers from first hands buying from the mills.

Part III. Wool and Shoddy Dealers and Brokers. Cotton Dealers and Brokers. Wholesale Rag Dealers.

Part IV. Buyers' Index of Textile Machinery and Supplies.

OUR NEW SILK DEPARTMENT.

In our May issue we started a new technical department which will hereafter be a regular feature of the Textile World. Additional pages have been added so that no other department or features will be curtailed. We believe this department will prove of interest to a large number of persons connected with this rapidly growing industry. There is no other publication which treats upon the technology of silk manufacture, and we believe there is a field here which the Textile World is well calculated to fill successfully, as it does the other departments of textile manufacturing.

Very little has been written about the processes of silk manufacturing, and most of the ideas and information which will appear in the pages of our silk department will be seen in print for the first time. We have been most fortunate in securing the co-operation of a staff of contributors eminently well fitted to handle the subjects which are assigned to them, and from the encouragement already received from the silk trade, we believe we will find an appreciative clientage.

No branch of textile manufacture has made such rapid and steady growth as the silk industry during the last 10 years. The value of our im-

ports of manufactured silk goods in 1892 was $31,208,399, while in 1898 it was only $23,416,919. Today American silk manufactures control the American market, and American silk mills are fully equipped with American built machinery.

Many of the processes of silk manufacture are closely analogous to those of cotton and worsted manufacture, and we feel confident that our many readers in other branches of the textile trade will find a new source of interest in this department, and thus be enabled to broaden the scope of their knowledge. Indeed, many of the men holding positions as superintendents and overseers in the silk district began their mill career in cotton and woolen mills, and in entering the silk field found their former experience of much value to them.

Special attention is called to the silk department in this issue, which will be found to contain articles of much interest and value.

TRUSTS.

The chief topic of discussion in the industrial world, occupying a large portion of the time of business men, still remains the probable effect of trusts, or combinations, upon the manufacturing and mercantile affairs of the country in the future. So long as everything is in a prosperous condition, as it is at the present, very little trouble may be anticipated, but serious complications are likely to arise when the time of depression arrives, and it would be the height of folly if no preparation was made for such a contingency. Many of these trusts are mere bubbles that will soon burst their thin coating, and bring about a crisis such as this country has never experienced, unless some action or preventive methods are instituted and the public made aware of the baneful effects that are likely to result. The laws of New Jersey, and now, Delaware, are probably contributing as much towards bringing about these conditions as those of any other state.

For the month of May, alone, the list of new corporations formed under the laws of New Jersey and Delaware, show a capitalization of nearly $600,000,000, including common and preferred stock. This applies only to such corporations as are organized with capitals of over one million dollars each. The actual money invested is but a fraction of this amount. These conditions will, in time, be brought before the supreme court of the United States, which has not yet passed an opinion upon the methods of business conducted by these industrial combinations. The most effective control, however, of these organizations, will have to be exercised through State legislation.

Just before leaving for Europe, Senator Hoar suggested a means which might be the subject of congressional action, for regulating trade combinations. "Congress may," he said, "impose such conditions as it shall see fit upon carrying on business by such combinations in interstate or international commerce, and one of those conditions may be that no business, with such exceptions as shall seem reasonable, * * * shall be carried on between different States * * * where the man who carries it on has the privileges and facilities of corporate powers, without individual liability, except in compliance with and in conformity with such conditions as the national legislative power shall prescribe."

It seems to us that some restrictive laws should be passed by States, so that a corporation organized by one State, cannot have free latitude of operation that is pernicious, in popular estimation, in another State. The only danger of such State legislation, is the likelihood of its abuse in those States that are under the influence of populistic sentiment.

The most dangerous feature of this legalized over-capitalization of industrial combinations, is that of centralization and approximation to monop-

oly. Whatever may be said to the contrary, this is really the great incentive to combinations of this kind, that of controlling trade, or influencing it potently. It must be apparent to everyone that manufacturers would not enter into these combinations unless they were tempted by arguments of being able to secure their raw material at lower prices, and selling their products at higher prices, and being able to operate at a less expense in the management of manufacturing properties and in selling. In order to make the inducement to manufacturers still stronger, the giving of common stock is partially resorted to as a bonus. Those chiefly interested in promoting these trusts, invariably state that none of their stock is watered, which anyone, who has any common sense, knows is not a fact; but rather to the contrary, and that the issuance of common stock is that much in addition to the actual money ever invested.

As is well known, capitalization is based upon the earning capacity of the properties that enter into combination, rather than upon the amount of actual cash paid in. This fact makes the matter of financiering a combination of this kind, one of much difficulty, which is now being experienced in some of the efforts made in the textile lines. It is not an easy matter to see how this common stock can be disposed of, to any great extent, unless the public is willing to be duped. There is a limit to ready money for investments of this kind, which are made upon securities that are more or less fictitious in value, or, at any rate, do not represent actual money cost. If idle funds go into these common stocks, there must be, in time, an end to this state of affairs, and so much money taken out of legitimate channels of trade, which must prove pernicious in its effect upon our mercantile and manufacturing industries.

The State of Delaware has entered the field in the passage of laws similar to those of New Jersey, in order to reap a money harvest for meeting its public obligations. Notwithstanding the State declares that its laws are not for the purpose of encouraging reckless incorporation and the extension of wildcat companies, as a matter of opinion among business men, it does just such a thing. The Delaware law is based mainly upon that of the State of New Jersey, but has, in many respects, advanced beyond that of the latter State in a number of important particulars. The laws of Delaware give, in common with those of New Jersey, the right to corporations of purchasing and dealing in real and personal property wherever situated, to any desired amount. Prior to 1896, this right was not authorized by the New Jersey law, a corporation then being restricted to the holding of real property not exceeding the amount stated in its charter. In both States, stock may be issued for property purchased, and in the absence of fraud, the judgment of the directors as to the value of such property is conclusive. Delaware, however, goes still further, and allows stock to be issued for "services" rendered, the value of which the directors are permitted to pass judgment upon. We remarked upon this feature of the law in one of our recent editorials, as being most pernicious in its tendencies, in the promotion of grossly fictitious values. Fraud is difficult to define, or ascertain, in transactions of this kind. This was one of the acts of New Jersey in 1896, revising its laws relating to corporations at that time; and it is almost beyond imagination to calculate what such a law is likely to lead to.

The Delaware law is playing against that of New Jersey for securing this trust, or combination, business. One of the inducements is, that the original fee paid for incorporation is about three-fourths of that in New Jersey; and the annual tax is about one-half of that in the latter State. The excuse for this is that the State of Delaware is a small commonwealth, and does not need a large revenue. It is fighting, however, for all it can get.

Another new and catchy feature of the Delaware law, is that the stockholders and directors may hold their meetings wherever they wish, and need never meet in Delaware. The New Jersey stockholders must meet in that State. Directors, however, under the New Jersey law, may hold meetings, have an office, and keep books (except stock and transfer books), outside of the State. This, however, does not apply to stockholders' meetings. According to the Delaware law, the liability of the stockholders is absolutely limited to stock that has once been issued for cash, property, or services. According to the New Jersey laws, the stockholders are liable until the subscriptions are paid, so far as the creditors of the corporation are concerned. This applies to stock given as a bonus, as well as to any other kind of stock. The stockholders' liability in this respect, is confined to creditors, and not to the company itself.

Corporations formed under laws of this character will find it rather difficult, we think, to have their securities listed at the New York Stock Exchange, as they are, or will be, anxious to do. Those that desire listing of this kind, our impression is, will be required to show their financial standing, and place it in such a form that it can be readily got at and understood. In fact, the Stock Exchange has already passed what it terms "Requirements for Applicants," for the placing of securities on the list, which call for a copy of charter of incorporation, whether it is an original organization or a combination of several previously existing firms or corporations; full description of the property entered, and character of product; report and statement of finance, showing result of business each year; a balance sheet showing assets and liabilities, of recent date; especial rights and privileges, if any, of directors; together with an agreement that the company will publish, at least once in each year, a detailed statement of its income and expenditures, together with an accurate statement of its financial condition, at the end of its fiscal year, or at a recent date. These are intended as safeguards for the public interest in industrial stocks.

THE ROLLER COTTON GIN.

To have the natural characteristics of the cotton staple retained, is a desideratum of the utmost importance to cotton spinners, and though efforts have been made in this direction, few real improvements have been consummated. The saw gin holds its ground remarkably well against the innovations that have been offered from time to time in the direction, most generally, of accomplishing the work of separating the fibre from the seed by means of the simple application of a roller with vibrating and rigid blades. This latter method has been found more commercially practicable with the Sea Island, than with the upland, variety of cotton, the latter being more difficult to handle than the former, because of the tenacity with which the fibre clings to the seed.

There has been quite a number of roller gins placed upon the market, with very indifferent success, among ginners of the upland cotton. All of these roller gins possess distinctive merits, and it would be difficult to decide which is the best—each doing its work perfectly, with the only disadvantage of not being able to turn out the necessary quantity in competition with the saw gin, the only thing that can possibly be said in favor of the latter machine.

It is well known that the saw gin acts deleteriously upon the cotton fibre, but it has never been scientifically ascertained to what extent this damage has been carried, or its nature. It is reasoned out that some injury to the staple is done, considering the harsh treatment to which the fibre is mechanically subjected. Nor has it been yet demonstrated that the roller gin does not also act deleteriously upon the fibre in its forcible separation from the seed. The

only essential difference in the mechanical action of separating the fibre from the seed, between the saw and roller gins, is that the former takes hold of the fibre in the centre and bends it V shaped, while the latter pulls it from the seed straight.

Experiments have recently been conducted with a new gin for cleaning cotton, known as the Cheeseman cotton gin, the advantages of which have not been demonstrated in a practical way outside of a few test trials of a few hours' duration. We have not seen this machine in operation, and, therefore, cannot speak from observation, but the illustrations and descriptions that we have received of it impress us favorably, as being able to cleanse the cotton from the seed with comparatively little injury; but this can be said of other roller gins, equally as well. The principle of construction of the Cheeseman gin seems to differ radically from that seen in other gins of this type. The proper way of measuring the capacity of this, or any, gin, is the amount of cotton that it will do per horse power, and the expense for keeping it in repairs, assuming, of course, that its mechanical simplicity will be of a character easily understood by plantation hands.

This machine has been exhibited at Charleston, S. C., and our reports from those who have witnessed its operations are certainly favorable, to the effect that the machine is substantially constructed, easily operated, with no vibration, and little evidence of wear and tear, cleansing the fibre from the seed perfectly, and improving the quality of the lint.

Much stress is placed by the inventors of the different roller cotton gins, upon the fact that there is no danger from fire as demonstrated by running matches in with the cotton as it is being fed. This elimination of fire risk, in this particular, pertains to all the roller gins that we ever saw, and should not be claimed by any one roller gin as not existing in other like machines.

This subject of ginning cotton, in connection with scientific testing of the injury that is done to the staple while being ginned, has again been taken up by the New England Cotton Manufacturers' Association, and we expect that it will be an absorbing subject for discussion at several of its future meetings. Valuable information, undoubtedly, will be obtained, but whether improvements will be instituted is quite another thing. One advantage will be that manufacturers will be furnished with facts, which they can utilize to suit themselves.

DUTY ON SILK MANUFACTURES.

The United States General Appraisers have rendered two recent decisions relating to silk manufactures that have an important bearing upon the control of the silk goods market in this country, for the domestic product. The decisions, in their effect, give the ribbon manufacturers an increased protection against the foreign article, of ten per cent., which is practically prohibitory of the importation of the latter. Heretofore, the duty has been fifty instead of sixty per cent., which is the duty imposed by the latest decision. It is quite possible that the matter will be carried to the courts for an opinion, on the part of the importers, and it still remains uncertain what the treasury department will do in the premises. The latter, it is reported, is preparing a brief, showing that a distinction is possible between ribbons intended for trimmings and those not intended for such use, and that the higher duty of sixty per cent. may be levied with propriety upon the former. The question largely depends upon the ultimate destination of these imported goods, a matter that caused infinite vexation in certain hat trimming cases under previous tariffs. The conclusions arrived at by the Board, in its late decision, have an important bearing upon the construction of the law. The Board declared that "goods which do not exceed twelve inches in width fall within the tariff provisions for trimmings. Those

which exceed twelve inches and do not exceed twenty inches in width, come within the provision for veilings. Those which exceed twelve inches in width, and do not have borders, or which have close woven stripes, or are figured throughout, otherwise than dotted, and all exceeding twenty inches in width, whether plain or otherwise, fall within the provisions relating to fabrics, according to weight, condition, etc." The point in this excerpt is the characterization of what constitutes a fabric. Ribbon, therefore, may be denominated, according to tariff interpretation, as a trimming, subject to a sixty per cent. duty, and not a fabric, subject to a fifty per cent. duty.

SILK MANUFACTURES.

About 25 per cent. of the consumption of silk goods in this country is of those of foreign make. This is reckoned upon a total net value of domestic silk manufactures of about $105,000,000, to which should be added $36,000,000, as the selling value in this country, of the foreign articles, making a gross consumption in the United States, of $141,000,000 of silk manufactures. The average duty on imports of silk manufactures is 54 per cent. ad valorem, or $12,645,135 on the value of imports for 1898, of $23,416,919, making a total of foreign value and duty, $36,062,054.

Most of the dress and silk piece goods are imported from France, though considerable quantities are received from Switzerland, Germany and Japan. Most of the silk ribbons imported come from Switzerland and France. The ribbons which are imported are mostly novelties and specialties, which are not made in the United States. They are made for the most part on hand looms in St. Etienne and Basle. The foreigners are the originators of these styles and their designs are exclusive. This class of imported goods finds a fair market in America. Nearly all of the foreign laces and embroideries come from France.

—We refer elsewhere in this issue to a bill that was introduced at the last session of the Connecticut legislature, to prevent surreptitious mixture or adulteration of woolen fabrics, but the bill was not favorably acted upon by the State. A bill with a like import has been introduced into the Michigan legislature, the first section reading as follows: "All cloths, fabrics, or garments, either wholly or partially manufactured, before being offered for sale at wholesale or retail, shall have attached to each and every piece or garment a tag or label plainly and permanently printed or stamped in the English language, with the true percentage or proportion of each and every amount of wool, or wool in the form of shoddy or flocks, or of cotton, hemp, flax or silk used in the manufacture of and composing said cloth, fabric or garment." These laws, should they be enacted, may, or may not, have a wholesome effect upon the character of our wool manufactures.

—There is nothing objectionable to the idea of any member of a labor organization being placed upon the board of trustees of a textile school, but it is questionable whether such a person should go on as an official representative of any such organization. We think that practical textile men, those familiar with the requirements of factory operations, should be on the board of trustees, but they should go on because of their knowledge of factory requirements, rather than representatives of any organization, whether in the interest of employers or employees.

—The fact hardly needs restating that for the past twenty years France has been in a condition of feverish restlessness regarding the acquisition of new markets for her manufactures, and that she has hesitated at nothing in order to obtain them.

RECENT EXPERIMENTS IN COTTON CULTURE.

HENRY G. KITTREDGE.

Lecture, with Stereopticon, under the auspices of the Fall River Board of Trade, Fall River, Mass.

My remarks at this time will have a direct reference to recent experiments for improving the commercial and manufacturing value of the cotton staple. The importance of enhancing the qualities of American cotton in those features that are becoming more and more essential for the requirements of a high grade of manufacture, is clearly evident to all who are engaged in cotton manufacturing and struggling to meet the sharp competition in trade. The necessities of the manufacturer are reflected back to the planter, who should be made to feel that his own success is involved in his being able to adapt his product to the needs of his ultimate customer. Haphazard cultivation of cotton is something that no planter, no matter whether he be a small one or a large one, can afford to do. It would be better for him to leave his land untilled than to plant it with seed taken promiscuously from the seed pile at the gin, or allow it to remain without the necessary fertilizing properties required by the plant for proper fruition. While yield per acre is of the greatest consequence, no less so is the character of the fibre that is produced. These essentials in the cultivation of

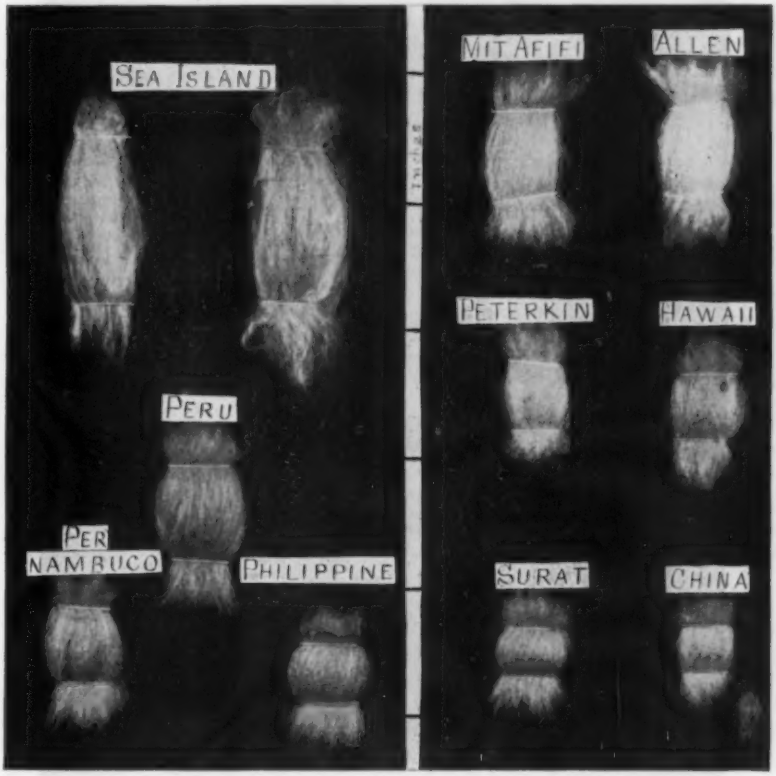


FIG. 1.

cotton become of increasing importance as the margin of profit decreases. If past experience and observation are any criterion of what will take place in the future, cotton will always be grown in the South whatever its price may be, whether it shows a profit or a loss to the cultivator; or so long as the farmer, willingly or unwillingly, depends on the crop as a means of obtaining credit for subsistence. With cotton holding its present position in the commerce of the world as a great money exchanging commodity, it will always be an attractive agricultural crop, with a constant tendency toward overproduction. Its cultivation also occupies a place in the agricultural pursuits of the South that cannot be taken by any other product, and gives employment to farm labor that otherwise might be idle. While the tendency to overproduction is a constant menace to the profitableness of cotton cultivation, this applies more particularly to the item of quantity than to that of quality. If these two items of quantity and quality, or of yield and attributes, can be combined in the production, there can be no cause for apprehension, under ordinary conditions, of a pecuniary loss in the cultivation of cotton. The excellent is always in demand, and if produced with proper consideration to economic methods and ends, must result advantageously

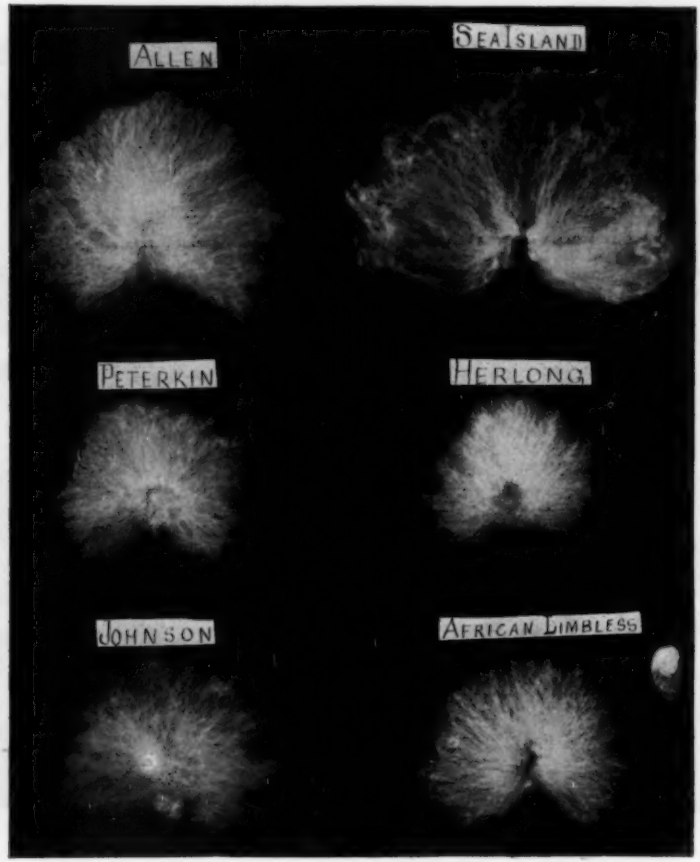


FIG. 2.

to the cultivator. This result, however, cannot be satisfactorily attained unless a sufficiently large quantity is produced to make it advantageous for a spinner to use. Hence, many, and not a few, planters should cultivate the same staple in order to get the greatest benefit. Spinners, as a rule, will not bother themselves with a few bales of cotton with characteristics different from their usual run, requiring changes in the adjustment of their machinery. Planters are oftentimes oblivious of this fact when they happen to offer to spinners a few bales of really superior cotton and obtain a price much below what its merits apparently should command. The proper thing, therefore, is for planters to join with others growing the same kind of cotton, and thus offer to spinners lots of cotton of sufficient size to make it an object to pay a price commensurate with the excellence of the staple. The only way this can be done is through the same mercantile channel. That a superior cotton, long and uniform in staple, and of good spinning qualities is wanted by American manufacturers, admits of no question. Finer and a better class of fabrics is called for, for domestic consumption; and, in order to fill this demand, importations of such cotton as Egyptian are made, as supplying a class of cotton intermediary in length of fibre between our Sea Island and the common upland. It is to supply this deficiency in the character of American cotton, more fully, that recent attempts have been made in different parts of the country to raise the standard of quality with due regard to yield.

FIG. 3.

Various means to accomplish this desideratum have been resorted to, chiefly those of selection and cross breeding, always in connection with a systematic method of cultivation. Resort has, at times, been had to exotic seeds, with usually disappointing results. I shall, however, refer to recent experiments with such seeds, that seem to promise some permanent success. Whatever is done toward improving the quality of the fibre, permanency, or the retention of any procured characteristic, must depend very largely on the judicious selection of seed for planting. Success in agriculture is dependent just as much on skill and intelligence as in manufacture or in any other vocation.

Fig. 1. We have upon the screen specimens of cotton staple grown in different parts of the world, typical of the poorest and the very best. The two Sea Island specimens are exceedingly good, both in length of staple and in fineness of fibre. These were grown on Edisto Island, South Carolina, and brought in the market five to eight times the price of the ordinary upland variety. The Peruvian specimen is known in the market as rough Peruvian cotton, imported into this country to mix with wool, with which it blends remarkably well, better than any other cotton. Pernambuco is a representative Brazilian cotton that goes to Europe. The Philippine and Hawaii specimens are introduced because of the peculiar interest at this time that is attached to anything belonging to the countries whence they came. The Surat is the typical cotton of India, and belongs to the same species as that grown in China. The staples of these two are very short, and the least desirable of any grown in the world. The Peterkin is a representative specimen of the common

upland cotton raised in the South Atlantic States, while the Allen is one of the very best long stapled inland cottons grown in the United States, ranking next to the Sea Island. Mit-Afifi is an Egyptian cotton, in much favor with fine yarn spinners, and largely imported. All the specimens represented were obtained from the place of growth and are thoroughly vouched for.

Fig. 2. We have now before us some of the typical cottons raised in the United States, all with fuzzy seeds, except the Sea Island, which has the naked seed. The lengths of staple can be judged of by comparison, calling that of the Sea Island one and three-quarter inches. The Allen fibre is much like the well known Peeler cotton, and grows to the best advantage on the rich, alluvial lands in the Mississippi River Valley, where the specimen before us was raised, producing 1½ to 2 bales of lint per acre. This was an extraordinary yield, but so reported to me by the planter. For all statements of this kind, relating to the farm, I am obliged to rely upon the information supplied me by the grower. The Allen staple is about the same in length as the Mit-Afifi, or brown Egyptian. This variety of cotton was named after J. B. Allen, of Port Gibson, Mississippi. It has a large boll that is inclined to open so wide as to allow the cotton to be easily beaten out by rain or wind. The specimen before us represents the Allen cotton at its best, showing a staple 1 7/16 in. long. Its production of lint to the weight of seed cotton is only 29 per cent., which is really above the average for this variety. The average yield of lint is usually reckoned at one-third of the weight of the cotton on the seed, for the common upland varieties. One-third is the standard. The Johnson variety, also shown, is not so well known as the Allen, nor has it so many good points. Its yield of lint to the weight of seed is less, and its length of staple is less, being only 1¼ inches in the specimen before us. The yield of lint per acre under the most favorable cultivation is one to one and a half bales. Taking cost of cultivation and yield together, these cottons ought to bring 20 per cent. more in price than the ordinary upland cotton to make them advantageous crops to raise.

FIG. 4.

The Peterkin and Herlong specimens are valuable varieties for the uplands in the South Atlantic States. The first originated in South Carolina, as the product of J. A. Peterkin, about 1870. It has many points of excellence, and all specimens that have come under my observation have analyzed well. The seeds of this variety are occasionally naked, or black and smooth like the Sea Island. The black seeded Peterkin has nothing particularly to recommend it. Its percentage of lint is extremely low, being less than 25 per cent. The specimen before us, and the varieties referred to, were sent me by Captain J. A. Peterkin himself, and his word must be taken that the black seed appeared, at times, in his crop as a product of his planting of the downy seed like that represented before us. To the botanist, an interesting question is here presented. The staple of this cotton is about seven-eighths of an inch long. Its yield is large; the percentage of lint to the weight of seed cotton being from 35 to 37. The Jackson is a new variety, to which I shall especially allude further on.

Fig. 3. Varieties and improvements in cotton are the results of either cross breeding or a judicious selection of seeds, under an intelligent system of cultivation. We have before us the cotton bloom at Fig. 1a with some of its parts at Figs. 2b, 3c and 4d. A greatly magnified grain of pollen is also shown, for the simple purpose of exhibiting its peculiar conformation. Fig. 2b shows the generative organs of the flower, which is a perfect one, with stamens at B attached to the pistil. The stigma is seen at A, the ovary at C, enlarged in Fig. 4d, showing the seeds, and the calyx at D, enlarged in Fig. 3c.

The terms hybridizing and cross breeding are indiscriminately employed to mean the same thing. Properly speaking, hybridizing is the fertilizing of one species or one of its varieties with the pollen of another species or one of its varieties. Cross breeding, on the other hand, is the fertilizing of one variety with the pollen of another variety of the same species. The result is a hybrid, in the first instance, and a cross breed, in the second instance. Notwithstanding the term cross-breed-

FIG. 5.

ing is more nearly to facts, in common practice the term hybridizing is almost universally used. For convenience, therefore, I shall employ the latter term, when referring to crossing, as being, perhaps, better understood, though scientifically incorrect. Some of our best cottons are derived from this method of cultivation. I shall assume that the functions of the generative parts of the cotton bloom and the agency of the pollen in fertilizing the seeds, are well understood. The process of hybridizing is very simple, and the one followed at the United States Agricultural Experiment Station, Auburn, Ala., is as follows: Good, healthy plants are selected, and the matured blooms of one are taken at a time when the petals—Fig. 1a, E. E. E.—are fully expanded, and these are removed by means of small scissors just above their bases, thus exposing the stamens (B) and pistils fully to view. The stamens—Fig. 2b, B—are then carefully removed by means of a pair of forceps, without bruising the pistils. Thus denuded of all male organs, the pistils are covered with thin paper bags, as a protection against the wind and insects, and left until the next morning, by which time they are fully developed with all their functions ready for the reception of the pollen. The blooms of another plant of a different variety are now taken, and, by means of a small, soft brush, their pollen is dusted onto the stigmas—Fig. 2b, A—of the first blooms. After two or three days the protecting bags are removed, and the new bolls, or developing ovaries—Figs. 2b and 4d, C—are left to grow under the influence of the sun's rays. The seeds of the matured bolls, or capsules, are preserved for the next season's planting, and the general results of yield and fibre characteristics carefully noted. Judicious crossing oftentimes, and perhaps, generally, improve the properties of the cotton, as length, fineness and tensile strength, as well as maturity. The end sought, of course, governs the selection of the

FIG. 6.

varieties to be crossed. Hybrid cotton is as much superior, oftentimes, to either parent as a hybrid grape, apple, peach or rose. Of course, that is the object of hybridization, that of uniting and strengthening the good qualities of two varieties. The Allen is thought to be a cross between Sea Island and an upland, followed by annual selection and intelligent cultivation. So with many others of our best varieties; and it would be well if planters would educate themselves to the importance of this and familiarize themselves with the proper methods for accomplishing the best results to meet the requirements of spinners.

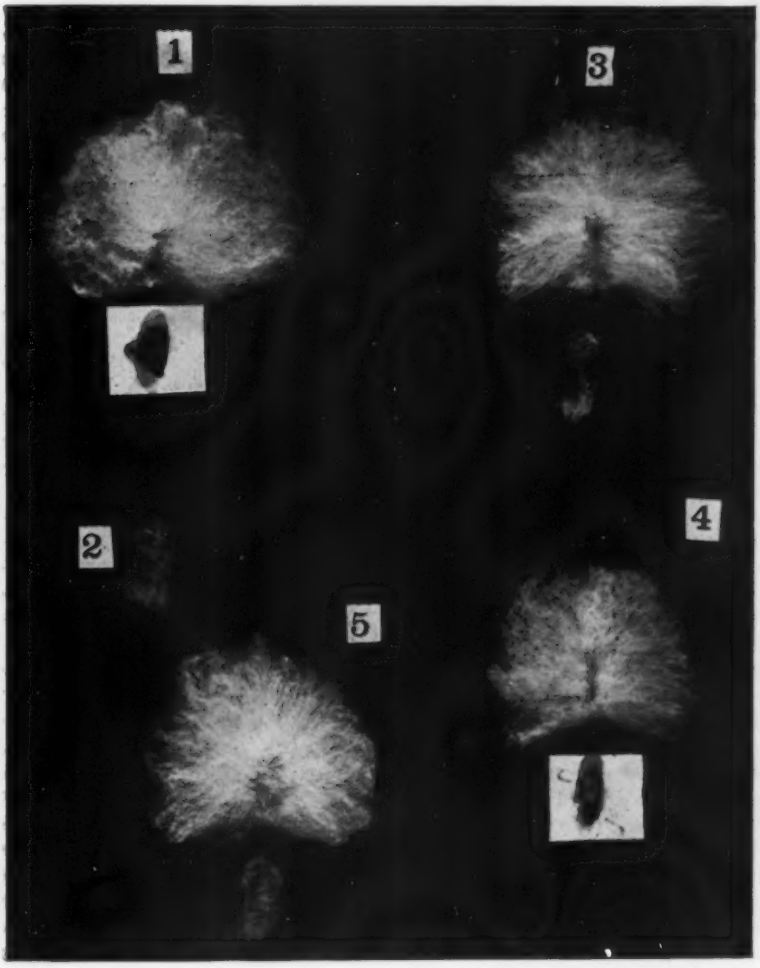


FIG. 7.

Fig. 4. We have before us a Sea Island cotton plant. A cross between a Sea Island and some upland variety is always a favorite experiment, and frequently the offspring is most satisfactory.

Fig. 5. We have now before us a Georgia variety of an upland cotton plant, known as the mammoth prolific. This variety is of unknown origin, but strong and well branched, with very

large bolls and good length of staple. The fibre is somewhat coarse, but usually of good body, so far as my observations with it have gone.

Fig. 6. We have now before us a cotton plant that is a cross between the Sea Island and the mammoth prolific. Several specimens of the hybrid cotton have been submitted to analysis by me. A cross of the Sea Island upon the mammoth produced a staple 1¾ inches long, and a cross of the mammoth upon the Sea Island produced a staple 1½ inches long, the cultivation of the two being conducted at the same time, under like conditions as to character of soil, fertilization, etc. Both crosses produced a black, naked seed, but the second yielded a finer fibre. The characteristics of the Sea Island were imprinted more strongly upon the mammoth than the mammoth upon the Sea Island. Similar crosses were made between the Allen and Sea Island at the same time, and like cultivation pursued, with this difference in the hybrids, that the principal characteristics of the two varieties were more evenly balanced.

Fig. 7. We have before us some very interesting specimens obtained from the United States Government Experiment Station, in Georgia. They are of one lineal descent, no crossing, no hybridization, so far as known, certainly not by any manipulation of man. Note the difference in the seeds, two naked, one completely so, and three covered with fuzz, tenaciously adhering to the seed. The question concerning these specimens is: Do they exhibit a tendency to reversion or atavism? In these we have the peculiarities of the Sea Island and upland varieties, so far as the nature of the fibres and seeds is concerned. I introduce these specimens to show how erratic cotton is, and how its eccentricities are not always readily accounted for. Cotton is oftentimes disposed to be sporty, and possibly we have examples of it before us. So, whatever precaution a planter may take in keeping the purity of his cotton unimpaired, there exists at all times the uncertainty of an abnormal progeny. To keep any special variety immaculate, from season to season, is a matter of much difficulty. The history of our present specimens is furnished me by R. J. Redding, the well known director of the Georgia Experiment Station, under whose supervision they were grown. In 1896, Mr. Redding planted a few seeds of Sea Island cotton, as raised in southern Georgia, in an ornamental plat of ground in front of his office. The product was that represented in No. 1, with long, silky fibre, and black seed, a veritable Sea Island cotton. There was no cotton of any other variety growing within two hundred yards of it. Some of the seeds from No. 1 were planted the next season, and though the plants developed after the fashion of the ordinary, tall Sea Island variety, the bolls were large, and, what was most remarkable, the seeds, instead of being black and naked, were green and covered with fuzz, as shown at No. 2. The fibres were coarser. Three bolls were selected from one of the stalks of the No. 2 cotton plants, the seeds of which were planted in 1898, with results as shown at Nos. 3, 4 and 5. Let it be noted that Nos. 3, 4 and 5 are from seeds coming from the same plant; No. 3, showing a seed only partly covered with fuzz; No. 4, showing a seed almost fully naked; and No. 5, a seed thickly covered with fuzz. There was no manual interference with this cotton, in the course of its three years' growth. Such being the case, the question is: What was the cause of these changes? Mr. Redding has expressed himself strongly of the opinion that the variations here manifested are due rather to accidental cross pollenation through the agency of insects than to a tendency to revert or to atavism. These examples of variation in the lineage of cotton, offer valuable material for study for the botanist. It is a well settled law of nature for all vegetable products to tend toward their original forms. There is a constant tendency toward reversion and erraticism, or to degeneracy from a high typical stand-

ard. The cotton plant is out of its natural element when brought to a high degree of perfection under careful cultivation. The further it gets from its original form, less prepotent does it become. Hence, the greatest circumspection has to be exercised in the selection of seeds for planting, taking only those from the most vigorous plants, and those bearing cotton having the most desirable characteristics.

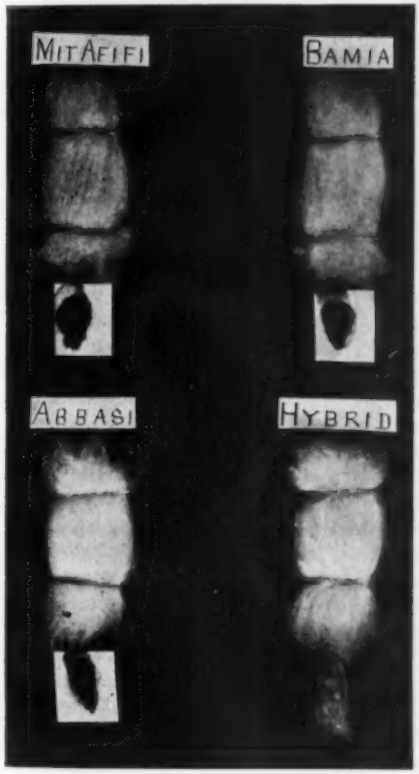


FIG. 8

Fig. 8. We have before us four specimens of cotton raised in Gonzales County, Texas, by W. H. Wentworth, from Egyptian seed. Three of these, the Mit-Afifi, bamia and abbasi, are pure Egyptian, with black, naked seed, and one is a hybrid, or a cross between the Mit-Afifi and a common local variety known as the Myers. As will be seen in the fuzzy seed, the Myers was seemingly a vigorous growth and impressed itself upon the cross, while the Egyptian gave length of staple.

Mr. Wentworth's cotton has been widely discussed and written about in the press throughout the country for the last two years. Quite a number of samples of it have been sent to me, on the bush and otherwise; and assuming these were representative, I can speak of them in no other terms than those of praise. The lengths of the several staples vary but very little, all being about 1⅝ inches long, which compares well with the length of staple of the imported Egyptian. Mr. Wentworth's aim is to supply a cotton to spinners that will meet their wants for fine counts of yarn, which are now made from the foreign article. His efforts should be encouraged by spinners so far as they can do so consistently, in the price paid and a willingness to try it, and continue its use if it proves satisfactory. This intimation, however, applies with equal cogency to all efforts of this kind for improving the cotton crop of the South. The enterprising planter should receive the hearty co-operation of the spinner. At the best, our most valuable cottons are kept up to a standard only by an intelligent system of selection and cultivation. There is at all times a dead earnestness on the part of cotton to degenerate. The cotton here represented is suitable for combing into fine yarns, and in this respect stands next to the Sea Island, as grown on the coasts of South Carolina, Georgia and Florida. Cotton with as short a staple as 1¼ inches is combed for hosiery yarns. The American Allen and Peeler class of cotton is suitable for combing, but we do not grow enough of it. There is apparently no great inducement for planters to undertake the raising of such cotton, which requires so much attention from the selection of its seed for planting to the time when it is harvested and ginned. My analysis of Mr. Wentworth's cotton as sent to me in the capsule on the

bush, showed a yield of lint to the weight of cotton on the seed of 31.35 per cent. for the Mit-Afifi; 33.3 per cent. for the bamia; 32.15 per cent. for the abbasi; and 28.54 per cent. for the hybrid. The percentage of lint from the hybrid seed cotton, as will be seen, was low. The average, however, is good, when it is considered that the yield of Mit-Afifi, in its native soil and climate, seldom exceeds 30 per cent., and that of the American Allen 28 per cent., and the Peeler 30 per cent. A singular incident presented itself concerning the hybrid in that one of its bolls, or capsules, had black, naked seeds, to the number of 26, while the other bolls had green seeds to the average number of 21.6. Here is a parallel instance of the erratic disposition of cotton to that already referred to in the experience of the Georgia Experiment Station of Sea Island wandering from its type. These eccentricities have, undoubtedly, their natural causes, but they, at the same time, offer to the scientist some interesting phases of nature's laws and nature's antics.

(To be concluded in July.)

European Fall Lines.

No. 4.

(Reported by the European Pattern Supply Co., 32 Greene St., New York.)

The success of the fall season was, according to information received from England, Germany and Belgium, decidedly satisfactory and it is believed that after receipt of further duplicate orders, which can safely be expected, that the entire result will be a good one; consequently the financial success will be better than the one of last year, as there was more sale in higher class goods in the present season, which paid better profits than the medium and low price grades, which have almost exclusively been in demand last year.

The prices of raw material being firm the value of all textile fabrics was likewise firm and followed the healthy condition of the cotton industry. The increase of prices was universal and the consumers stood before a fait accompli and were forced nolens volens to pay the same, and it is not feared by manufacturers that a reaction will follow.

The production of foreign wool is not sufficient to satisfy the demand and it will not be surprising that we should find a shortage of such wools in a very short time, especially Australian wool. It follows that the consuming of shoddy in connection with pure wool takes larger dimensions and it is interesting to see what wonderful results are accomplished in the manner of spinning and manufacturing such stock. At the world's exhibition in Paris next year, there will be a chance to inspect such products of Germany and England.

As in regard to patterns of this year's fall season, we have come to the final conclusion that besides uni goods, there has been a demand for just two special kinds of patterns in fancies. These were small, sometimes almost invisible, designs in fine qualities and plaids and double plaids in medium and low price qualities, and it shows that the prediction of the German manufacturers, in making specialities of these two branches of fancy goods in their original fall lines, have been verified. The wholesale clothing manufacturers of the entire European continent were only too glad to adapt themselves to the new designs, as it gave them a better chance to calculate for their higher prices, as would have been the case had they to ask an advance on goods, which had been handled for several seasons past.

We have stated in previous reports that the taste for worsted goods in medium and better qualities, is diminishing and that there is more demand for cassimere goods with Saxony finish. This has been confirmed by latest reports from Europe and we have also noticed that a like condition of affairs is existing in the American market.

When Globe patterns are imitated in all sorts of qualities, down to the so called cotton worsteds, then it is time that the better manufacturer turns his looms on to a different branch of the industry and it is necessary for him to create novelties, in order to escape the immense army of imitators. We wish to state right here, that probably in a very short time, a real silk material will be put on the market, out of which can be spun a yarn, which is exclusively fit for the manufacturing of cloth like our present woolen goods for women's and men's wear and it will open a new era for the manufacturing of fancy goods in particular. The price of this new material will be about the same as the fine worsted yarns.

Pantaloonings have also had a very good sale in all of the European manufacturing districts and while there has been a considerable demand for velours and Cheviot finish, the principal demand was again for worsted goods and no doubt, these will predominate for some seasons to come. As in regard to designs, we have noticed that the same have been in line with the taste for large plaids in suitings, and a great many styles have been ordered, which, no doubt, are at present incomprehensible to the American manufacturer, but they will probably find their way here two or three years later.

With this, we wish to close our reports for the present fall season, but in conclusion, we wish to express some views and comparisons we have experienced and which we believe will be of interest to quite a number of readers of the Textile World.

We are referring to the difference between the European and American wool manufacturer. Both of them manufacture cloth from wool and other material which they buy in the market, but they differ in the creation of their lines and production of new articles. The European manufacturer does not, by any means, make his novelties for the season without seeing and comparing samples of other makes, but he, however, does not imitate a sample exactly as it is laid before him, but studies out the merits of a number of designs and with the help of his originality, he brings out styles and designs, which are absolutely new and of a value that brings him and his customers profitable business. There are large sums of money expended for the creation of new sample lines, whereas in this country, the manufacturer does not endeavor, to any extent, to construct something new, but depends almost entirely upon selection of patterns by his commission houses or their employees and their selection he follows almost exactly, and is, in consequence, nothing but an imitator of foreign products. The difference of success between the European and American manufacture illustrates sufficiently, which plan is the more feasible.

From samples, which have been received for the coming season, the direction of the taste cannot yet be determined. One thing, however, is certain, and that is, that there will be a large percentage of plaid patterns again and also a number of novelties in stripes.

Cheviot material will predominate, both in connection with wool and worsted and as in regard to finish, we are informed that the Saxony finish will be most conspicuous.

In our next report will be found the first description of designs for the coming spring season.

The New Bessonette Cotton Press.

The present system, or rather lack of system, of baling the American cotton crop is on the eve of being superseded by improved methods. The field is an inviting one for the inventor, and it is not surprising that several new systems of baling and presses are already in the market, with a number of others to be heard from.

The latest round bale is made on the new Bessonette press. Mr. Bessonette, the inventor, has devoted the

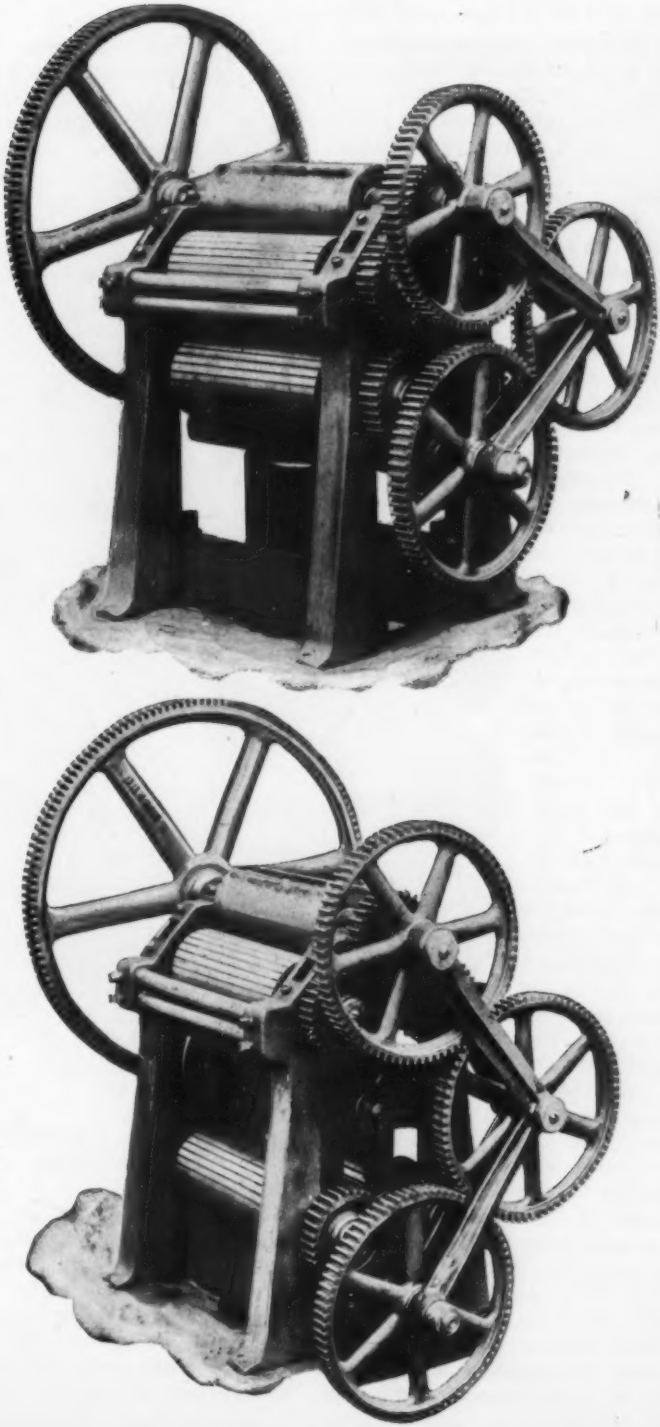
past nine years exclusively to work in connection with the round bale press, and a number of his patents are embodied in the systems used by several companies. His latest machine, which is controlled by the Ginners' Compress Co., Marquette Bldg., Chicago, he believes embodies radical improvements, one of the most important of which is the absence of the core or mandrel, around which the cotton is rolled and compressed. In this press the cotton forms its own core. This feature, besides eliminating much expense in operating, results in preventing any injury to the cotton fibre and gives more uniform density throughout the bale. In the sample bales that we have seen and opened, the cotton in the centre of the bale was not in the slightest degree matted, nor did the fibre appear to be in any degree injured. The bale unwinds in a continuous, even lap to the very end.

The press requires a floor space of 5 x 8 feet. It is connected with the condenser and gin stands so that the process of ginning and baling are continuous. It weighs in the neighborhood of 10,000 lbs. The absence of the core does away with much machinery and is claimed to increase the capacity of the press. When running from four gin stands, the press, it is claimed, will bale about 40 bales a day. Very little time is consumed in getting a bale out and starting a new one, which increases the capacity of the machine. The cotton is fed to the press directly from the condenser in a smooth, even lap, which passes between compression rollers, which exclude most of the air. Through the action of the four rollers operating in the same direction, the cotton takes the form of a cylinder, rolling lap on lap until the bale is of the desired diameter.

The illustrations show two views of the press, one in which the rolls are in working position, and the other when the press is opened to throw out a bale. At the starting of the bale about two pounds of cotton fills the space between the rollers, and the pressure does not begin to exert itself until about 75 lbs. of cotton have gone into the press. After that the pressure increases automatically with the size of the bale. The cotton in the centre of the bale being thus uncompressed until the bale is partially formed and the pressure begins to manifest itself, keeps the fibre free from injury and prevents the damage that is likely to ensue from its being crushed on a hard core or mandrel, and it is claimed that the Bessonette bales will unroll lap on lap to the very end.

The covering of the bale may be either cotton duck or jute as at present. As there is no spring or expansion of the bale when it comes from the press, the baling is, therefore, simple and there are no ties to break nor wires to snap from heat or injury. The covering is put on while the bale is in the press, the end covering being of the same material and sewed on after the bale is removed. If cotton duck is used, the cost of the covering is about 20 cents, and its weight is 2½ lbs. The density of the bale ranges from 35 to 40 lbs. per cubic foot, and the weight from 270 to 300 lbs., although in practice 250 lbs. would be the average weight. The bale is 35″ in length and, approximately, 22″ in diameter.

All the advantages in the way of economy in shipment, freight and insurance that are claimed for other round bales can properly be claimed for this, and in the matter of sampling, it is claimed that the Bessonette bale has some advantages over the others. In the bales that we have seen, samples were obtained by cutting the covering in the side and drawing the sample therefrom; samples were also drawn from the end. This, of course, exposes the cotton to dirt to some degree. In this particular, it seems to us that all the round bales stand very nearly on parity, for it cannot be maintained, even by those most interested, that they can be sampled with the same ease as the old square bale. We believe that the guaranteed bale, which is rightly advocated by the



promoters of all the new bales, is a proper method of handling cotton, although it has aroused the keenest opposition from an army of middlemen. The improved bale is bound to come however, and if it involves the doing away with the obnoxious system of sampling every time the cotton changes hands, that custom will have to give way, for in the end the farmer has to stand it all and the companies which guarantee their bales and save the waste and expense of sampling can afford to pay the farmer a higher price for the cotton. The factors and the middlemen have no good except that of old argument to use custom for the present cumbersome and wasteful system of buying and selling cotton. The Egyptian crop is sold in what are practically guaranteed bales. It was not so many years ago when it was thought necessary that every barrel of flour should be sampled, but such a proposition today would excite ridicule. The arguments, to our mind, are all in favor of the guaranteed bale, and so many large interests will now range themselves in favor of this reform that it is bound to come sooner or later. So in the case of the different round bales, it seems to us that ultimately the question of sampling will be of minor importance, although at the present time it seems to be one of the principal objections raised to them.

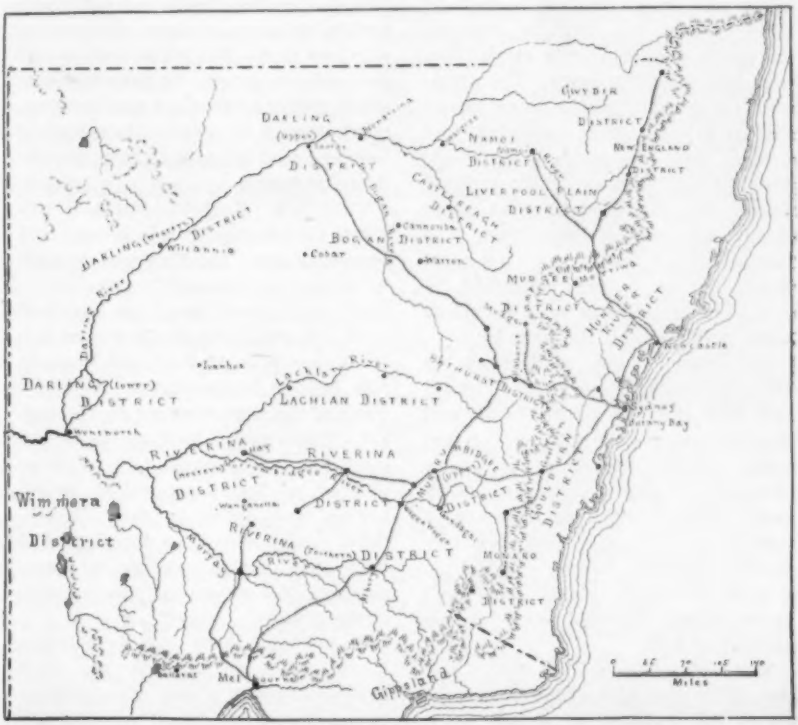
The Ginners' Compress Co. will inaugurate a radical change in the method of handling their press. It is to be sold outright to the ginner. There are no royalties or commissions or share in profits to be asked. The ginner buys the press outright as he buys his gins, and we think this feat-

ure of their business will appeal favorably to the Southern ginners insomuch as it will involve no change in their present methods of doing business. It does not even necessitate throwing out their old machinery; the new press can be installed beside the old and ginners can then offer to their customers the option of the square or round bale. We understand that a considerable number of orders have already been received from the South, and that a number of presses are now being turned out as rapidly as possible, so that there will be an opportunity to test the press in actual operation on this season's crop.

Australian Wool Clip—1898.

As the Textile World is permanently kept in private and public libraries as a magazine of reference in all things pertaining to the textile industries, and as it is a matter that is likely to remain of interest to those desiring to keep reliably informed of the wool production of the world, we give below Goldsbrough, Mort & Co.'s report on the character of the Australian wool clip of 1898, and accompany it with a map carefully prepared by us, which we have used the last two years, showing the locations referred to.

Melbourne.—When writing on the 1897 clip, we reported it as being all round one of the worst marketed for many years, and with only a partial break-up of the long continued drought, we regret that no material improvement has taken place in that of 1898. Speaking generally, the clip under review is deficient as regards growth, length, and strength, is lacking in robustness and density, the staple being thin, poor in yolk and in wasty condition, burr and grass seed being very prevalent.



Victorian.—The western district wools were light in condition, but more or less tender and dusty in the majority of the clips. Wools from the Wim-

mera and northern and northeastern districts were again poorly nourished, thin, open, tender and wasty. The Gippsland wools varied considerably in condition, being sound and fairly well grown—still some clips were harsh and tender.

New South Wales.—Although the Eastern Riverina wools were still very attractive to the eye, being light in yolk, soft and of fairly good color, but rather dusty and lacking that brightness which is generally so characteristic of them, a large portion of the clips were tender and poorly matured. The Central Riverina and Murrumbidgee wools were again in an earthy and wasty condition, the effects of the drought being very noticeable. Wools from the Central districts were in many cases fairly sound, with a good growth of staple, light in yolk, but dusty and more or less seedy and burry. From the northern districts, the wools were shorter in staple, fine, with little yolk, but dusty. The southwestern division wools were tender and in a very wasty condition, and without style, the staple being partly perished, and had evidently suffered more from the drought than those of any other part of the Colony. The Darling River wools were as usual wasty, but not in such a marked degree as in the previous year, the staple being better grown and sounder.

Queensland.—Those wools from the Mitchell district were of good length and color, dry, but a little dusty, and showing more seed than in the preceding season. Southwestern wools, although of good staple and fairly sound, were very heavily impregnated with earth. The staple from the southeastern districts, having experienced a more favorable season, was well grown, sound, fine and carried a fair amount of yolk.

Tasmania.—The general run of merino wools from this colony were quite up to the standard of recent years, some clips reaching a very high standard of excellence, being very fine, bright, dense, rich in yolk, although somewhat irregular in length of staple. The crossbred wools were bright, sound, well grown and of good style.

Sydney.—The clip of the colony as a whole showed very plainly the effects of severe drought, the season's yield being found weak and dusty, as well as being badly infested with burr and seed.

From the Darling and Bourke districts, the staple was fine in hair and attenuated in growth, showing a deficiency in elasticity and yolk, and being especially wasty in the backs, although comparatively free from seed. Wools from the Liverpool and Gwydir evinced the effect of an ungenerous season in a marked degree, by the production of an inelastic fibre, concurrently with earthiness (more especially along the backs) and an excess of burr. A good portion of the Central division proved an exception to the general rule, in that the clip did not differ materially from that shorn therein the previous year. The staple had no appreciable weakness, its generous condition giving evidence of good nourishment, though it was handicapped by burr and seed being in as frequent evidence as usual.

The New England product was above the average both in growth and attractiveness. The fibre was generally of good quality and length, elastic, fairly bright, and free from burr and seed, but whilst the staple was of fair excellence, a great deal unfortunately was lacking in the manner in which many of the clips were got up for market. Unevenness, both of staple and condition, was apparent in a large number of instances, whilst pieces, bellies, and locks—in fact, "everything"—were too often found packed with good, well grown, bright fleece wool, to the undoubted disadvantage of the grower.

From round Forbes, on the Lachlan River, down to Riverina, the wool gave evidence of a very severe season having been experienced, considerable dust impregnating the fleece, which also lacked soundness in staple, a characteristic (accompanied by a lack of normal brightness) too much in evi-

dence also in the Eastern Riverina wools.

Wools from the northern portion of Monaro reflected the usual effects of a very dry season, dust and dinginess being particularly noticeable. The southern portion of that district on the other hand fared rather better, although a considerable proportion of the clips therefrom were not quite sound in staple and were lighter in condition than last year. It gives us satisfaction to note that several of the parcels from this district as a whole showed more care in their preparation for market than in past years, but there was still room for improvement in others, which came forward absolutely unskirted, and showing "tick stain" to an extent materially affecting prices.

Adelaide.—The condition of the clip shows clearly the better season. Generally speaking, the wool has been well grown and sound, heavy in yolk, and more burry and seedy than usual. Almost everywhere the cut of wool per sheep has been heavier than last year.

Textile Machinery in Japan.

While the textile industries have been developing in the most rapid manner in Japan, American manufacturers have been inert in attempting to supply an adequate share of the consequent requirements in machinery. It is a market well worth attention, for the demand for spinning and weaving machinery in Japan will be steady, for the double reason that the manufacture of textiles will be extended beyond the lines it has so far reached and the probability of Japan attempting to construct her own textile machinery is exceedingly remote.

The total amount of spinning and weaving machinery imported into Japan increased extraordinarily during the past few years, namely, from a value of $1,071,574 in 1895 to $1,615,907 in 1896, and to $2,904,489 in 1897. Of the latter total, $2,700,847 represented the value of the spinning machinery and $203,652 of the weaving machinery imported.

Practically the whole of this machinery was supplied by Great Britain, who furnished all of it excepting $107,915 worth. During the same year, 1897, Germany furnished $28,163 worth of spinning and $32,491 of weaving machinery; France $19,506 worth of spinning and $9,655 of weaving machinery, Belgium, $3,860 of spinning and $110 worth of weaving machinery, and Switzerland, $1,288 worth of spinning and $178 worth of weaving machinery.

Importations of this class of machinery from the United States only began in 1896. In that year we sent $1,138 worth of spinning machinery and $7,719 worth of weaving machinery. In the following year we improved on our exports of spinning machinery to the extent of $4,575 while our shipments of weaving machinery amounted to $7,515. In other lines of machinery, outside of steam engines, boilers, sewing machines, typewriters, or printing presses, the progress made by this country has been better, the amount of our exports to Japan being $97,472 in 1895; $277,468 in 1896, and $909,031 in 1897. When it is considered that Japan's imports of machinery of all kinds amounted to a value of $6,145,516 in 1897 it will be seen that there is here open an extensive market of which American machinery makers have so far taken little advantage.

The textile industry of Japan has made most rapid strides in the spinning of cotton yarn. The exports from Japan of the latter amounted in value to $517,239 in 1895; $2,014,712 in 1896; $6,745,098 in 1897, and to $4,725,724 for the first half of 1898.

It is only in the finer grades that Japan imports any yarns now, and in these she is making efforts to supply her wants. Her spindles have increased from 700,000 to over 1,000,000 in the past three years and over $10,000,000 are invested in her 57 or more mills. Last year the increase in the

number of spindles resulted in a glut in the yarn market, but new outlets are expected to be found for the surplus production in China, India, etc., and new uses are being found for the increased production at home. Cotton has been substituted for hemp in the fabrication of fishing nets, an important item when the large fisheries of Japan are considered.

In cotton manufactures, other than yarn, Japan's exports have been as follows during the past three years: 1895, $1,216,464; 1896, $1,175,566; 1897, $1,294,354.

Regarding the status of the Japanese textile industries and the opportunities that offer to American machinery makers in that country the following comments from a correspondent of the Philadelphia Commercial Museum at Kobe will be found to be valuable and instructive. He says:

"The spinning machinery now in use is all or mostly of English make and used for the coarser grades of yarn. No fine counts are made yet. As Manchester cotton goods form one of the chief items of import it is but natural that the spinning and weaving of cotton goods will become one of the industries of the country in the course of time, since the Japanese copy everything. Every machine is of interest to the Japanese. American makers of textile machinery are in a position to judge if they can compete with European makers.

"There is very little power loom weaving done in Japan. A few French silk looms are at work in Kyoto. Silks and cottons are mostly woven on primitive hand looms. Brocades and figured goods are only produced in small quantities and at high prices. The French fabrics beat the Japanese all to pieces. The Jacquard is being used to a small extent but the most elaborate work is produced by hand work on heddles and reeds, which is very slow. Narrow width fabrics (12 inches) are mostly used for the native dress known as 'kimono'.

"As no stockings are worn with the native dress there is no demand for knitting machinery except for fancy obis or waist bands. The machines that are used are obtained where they can be purchased the cheapest. Having been five years in Japan and having seen about one dozen of these machines the writer has come to the conclusion that it would be useless to attempt to introduce any more. I have never seen any machine for the production of underwear. There may be in the future a demand for this machinery, when the natives adopt the foreign mode of dress.

"Machinery for the manufacture of carpets set up in a manner to impress the people would find a ready sale. Catalogues and circulars will do little or no good,—actual exhibits must be made and the advantages of utilizing labor-saving devices shown.

"All labor-saving devices will find a ready market in this country, as the Japanese are the most alert people imaginable and copy everything. They are ready at all times to avail themselves of any form of improvement that they can make use of or that their means can purchase.

"Cotton spinning may be said to be the first successful factory industry of Japan, and it has rapidly grown to considerable value. The general manufacturing business of Japan is not conducted in any organized factory system but is, in the main, simply a house to house employment as it is conducted in Switzerland in the watch industry, for example. Cotton spinning as now conducted proves that the Japanese, as well as other nations, can be made subject to the requirements of regular hours and the use of machinery. This means that machinery will by degrees supplant the older and crude hand methods of olden times. Japan will rapidly increase its use of every class of machinery. The present obstacle is the lack of capital and small requirements of the present mode of life among the people.

"Intercourse with foreigners is every day increasing, as well as the

desire for foreign cloths and style of living, so that it is only a question of time until every article of wear and domestic use will be wanted. Capital will take advantage of the modern methods of production and machinery will have to be used."

The centre of the spinning and knitting business is Osaka, which has 15 spinning mills out of a total of 52. The Osaka mills have 280,000 spindles, employ 4884 men and 15,665 women, 6481 of the latter being lodged and boarded at the factories. Four of the 16 weaving establishments are also located at Osaka.

Five of the remaining weaving factories are situated at Tokyo, four at Kyoto, and one each at Nishinomiya, Sidzuoka, and Wakayama. All of these employ machinery. In addition there are 600,000 hand looms in operation in Japan and it is stated that they employ 890,000 women and 50,000 men. As stated above these hand looms are generally operated in the home. These looms are hand made and are principally used in supplying some million pieces of goods about 14 inches wide, and from 12 to 25 yards in length for the home market as well as for export to China and Korea. They cost about $2.50 gold each. The comparative cost of labor is about 1 to 10 in favor of the power loom which should tend to crowd out the hand loom, and the progressive spirit of the Japanese will undoubtedly bring about the substitution of the power loom in the course of time. For that period the American manufacturer should be prepared.

The silk industry in Japan is in an advanced condition. The largest silk factory in Japan using power looms is the Kyoto Orimono Kaisha, of Kyoto. It imported these machines from France. It was the intention of the company to manufacture silk fabrics for export; but after some years of unsuccessful attempt the project was abandoned, and the company commenced making satins and "obi" materials for home use. In these lines, it is said, it has been very successful. This mill also manufactures curtain and upholstery materials and it has found a good market for them in England and Australia. The power looms first obtained have been copied in Japan and the company is using large numbers of them; but they are not equal to the imported ones.

The manufacture of woolen goods is a new industry in Japan and a small one, as only about 13 per cent of the woolen textiles used in Japan are made in the country. The raw material is all imported from China, Australia and London. The four woolen factories of the country are located in Osaka and Tokyo. One is owned and operated by the Imperial Government and manufactures supplies for the army and navy. Some of the better grades of cotton and woolen yarns are made there, but they are mostly imported. A large proportion of the woolen cloths used are made on hand looms similar to those already referred to.

There are four flax mills making canvas and twine located in Shimotsuke, Sapporo, Otsu and Osaka.

On July 16th the new commercial treaties between Japan and the Western powers will come into force and after this date foreigners will be entitled to carry out all kinds of commercial and industrial operations and to settle down in any part of the Empire instead of being restricted as heretofore to the treaty ports. Under the new tariff, which went into effect on January 1st, the duty on machinery has been raised from 5 per cent. to 10 per cent. ad valorem.

A valued correspondent of the Philadelphia Commercial Museum at Yokohama, whose experience gives weight to his views, has this to say on the subject of American trade with Japan:

"A market cannot be opened up here for new things by means of correspondence, catalogues, advertising and all that. From long education, the force of custom and innate conservatism,

dealings between the American seller and the Japanese buyer cannot be carried on direct but must come through the medium of established agencies or commercial houses here.

"Japan is no new country ready to be exploited; there are here, and for years have been, established American, English, French, German and other houses who have both capital and experience and their competition must be met. The fact is, if our merchants, manufacturers and producers show a better article for the same money, or as good an article for less, they will undoubtedly meet with success if they use the right methods; on the other hand, should their goods simply be equal in quality and price they must rely upon the same conditions and the same aids here as at home, that is, personal influence, advantageous connections and all that.

"If you have something to sell that you believe the Japanese would buy, or should buy, come over here and try to sell it to them, or induce some one of the American houses here to handle it for you."

Care should be taken in opening connections with native traders for it has been observed that the commercial morality of some of the Japanese in trade is not a conspicuous trait of their character. The Information Bureau of the Philadelphia Commercial Museum is well informed as to the standing of the Japanese business community and American manufacturers intending to open up relations in Japan will do well to acquaint themselves through this channel with the standing of the buyers as well as the general conditions that prevail at various points, and the transportation charges, tariff, port regulations, Governmental requirements, etc., etc.

Linen Fabrics for Tablecloths, Napkins and Bed Covers.

The latest designs in table linen may be known by their stripes. That is, when you see a striped tablecloth you may put it down as a very new one or a very old one. Some of the patterns which were used twenty years ago are making another appearance now, and so, too, are some tablecloths of the same date.

A writer in the New York Sun says that it isn't likely that much of the table linen made today will survive so long. Unless the twentieth century goes back to some of the ways of the eighteenth, to the old and careful bleaching of linen in particular, there will be no tablecloths which will last for twenty years and no sheets which will wear thirty years. It isn't altogether the fault of the makers that linen doesn't wear as it once did. Things that are made in a hurry wear out in a hurry, and there's no help for it.

"Once," said a well-known Broadway dealer, "nine weeks were spent in bleaching linen. Now you can get it done in nine days. Of course, there is a difference. There is the slow bleach linen from Ireland and Scotland, which for wearing qualities is the best in the world. It costs more than the same grade of linen bleached by a quick process. When a manufacturer has to prepare his goods in a rush he first gives the linen a strong chlorine bath. Then he puts it into water, gives it a weaker chlorine bath later, and so on. You can imagine the effect this has on the thread when I tell you that the French linens bleached in this way weigh only two-thirds what the Irish slow-bleach linens weigh. The chemicals burn up a third of the material. That is what it amounts to.

"In olden times, a man used to dip water from a trench and scatter it over the linen on the grass. It is said that they could, with a sweep of the arm, send the water in an even shower over an astonishingly large area. But people won't wait for that sort of thing nowadays. So the chlorine bath is having its turn.

"Linen in this country? Oh, they don't make linens here; nothing but the cheapest, commonest varieties. Everything we handle is imported. Linen, so far as its geographical ori-

gin goes, is like all Gaul. It is divided into three parts—Irish, French, and German. Among the Irish linens, because they are of the same style so far as they go, are included Scotch linens. And among the German linens are also included the Austrian. I haven't much to say about Austrian linen, though. It is a poor imitation of the French. The German linens differ, according to the locality they come from. Those that are made around Dresden are of excellent quality, while those that are made in the hills further south are poor.

"The new designs come from France. In Ireland they use the same patterns year in and year out, and there is always a steady demand for them. But in France they are constantly devising new styles. The French linen is lighter in weight, sometimes almost as fine as a pocket handkerchief, and of course it doesn't wear so long as the heavy Irish linen. It isn't intended to. Here is a beautiful tablecloth from France. It has a mixed design, you see, but the stripes occupy the conspicuous place."

The cloth indicated had a double border, composed of a festoon design about a foot in width, a perfectly plain strip of the same width, and then the festoon design again. The centre was of longitudinal stripes of the plain damask about three inches wide. Another design, which indicates the popularity of stripes, and is revived from the styles of twenty years ago, is called the thousand-line pattern. It is of damask in stripes of a quarter of an inch in width, separated by hair lines. It has no border at all. Most of the cloths, however, have the double border.

The dealers say that, judging from the cloths they sell, the round table is still in favor. The usual size of cloth for a round dinner table is four yards square. Dinner napkins are almost large enough for small luncheon cloths, some of them being three-quarters of a yard square, others being oblong in shape and measuring 30 by 39 inches. A fine cloth 2½ yards square costs from $40 to $50. The same cloth four yards square costs about $120. Some of the specially fine French cloths cost $75 when they are only 2¼ yards square. Dinner napkins of fine quality often cost $60 a dozen. Where the cloth has a double border the design in the napkin matches the part of the cloth which shows on the table. That is to say, the napkin does not repeat the double border. It has only the inner one which, on the table, should run at the edge of the board right under the plates.

When it comes to lace-trimmed linens for luncheon tables, the prices take a big jump. One large round linen cloth, with an inserted six-inch band of point de Venise lace and a little wider border of the same lace, costs $450. A mere centrepiece, trimmed with the same lace, costs $250. Among centre pieces, those trimmed with Duchess lace are the swellest thing. The colored laces have gone out of style. The butter-colored lace trimmings which had such a rage at one time are quite superseded by white. Point de Venise is very fashionable, but when it is in the very pale ecru, in which it so often comes, it is not the thing. One dealer showed a little centrepiece trimmed with point de Venise in pale ecru. It had been $20, but he said it could be bought now for $5. A $450 cloth, trimmed with the same lace, had been marked down to $250.

"Hemstitching, too, is decidedly on the wane," he said. "Of course, some of it is shown, but the latest thing is—well, the oldest thing, I suppose, in hems; that is, a narrow hem sewed by hand. The more it can be made to look like a selvage, the better. The idea, of course, is to make it look as if it was a made-to-order cloth. Do we ever make cloths to order? If you mean, do we have a cloth woven from a unique design made for it alone, we do not. People will tell you that they have cloths made to order when they go abroad. I think that all they do is to go to a manufacturer who submits a good many designs to them. They

fancy that they are choosing from designs which are not sold to regular dealers, and that, when they get a cloth made from the design they choose they have something unique. But I doubt it. I think they have simply ordered a tablecloth which you or I could order in the same way at the same place.

"Occasionally they have their monogram woven in the cloth. But that is a simple matter. All the manufacturer does is to cut out a section of the cards of the original design, insert those for the monogram, and the thing is done. These cards for the weaving were formerly cut one by one with a great deal of labor and care. Now a lot of them are cut at a time, very much as ready-made clothing is cut out by the east side tailors in New York. When a monogram is woven in a cloth it seems to me that the proper thing would be to have it appear at each corner of the centre portion of the cloth. But I believe it is oftenest put right in the middle, just where it is all covered by the centrepiece.

"For luncheon, people who have handsome mahogany tables do not use cloths, but merely use a centrepiece, with doylies for the plates and dishes. Luncheon napkins are from fifteen to eighteen inches square. We sell a good many of the colored linen cloths for afternoon tea tables, but they are not used for anything else. No fringed napkins are used for anything. They are obsolete."

The most beautiful linen sets for beds also come from France. One set, consisting of an upper sheet and the halves of two pillow cases, was marked $65. They were exquisitely embroidered by hand. The use of fine linen covers, embroidered in colors, for trimming beds, has gone out of fashion. They were very dainty, with their Dresden flowers in pink and blue, their festoons and bow knots. But their time has gone by. Lace is now the garniture, if the expression may be used, for trimming beds. Fine Swiss covers with insertion of lace, grenadine with lace stripes, and similar materials are used over colored silk.

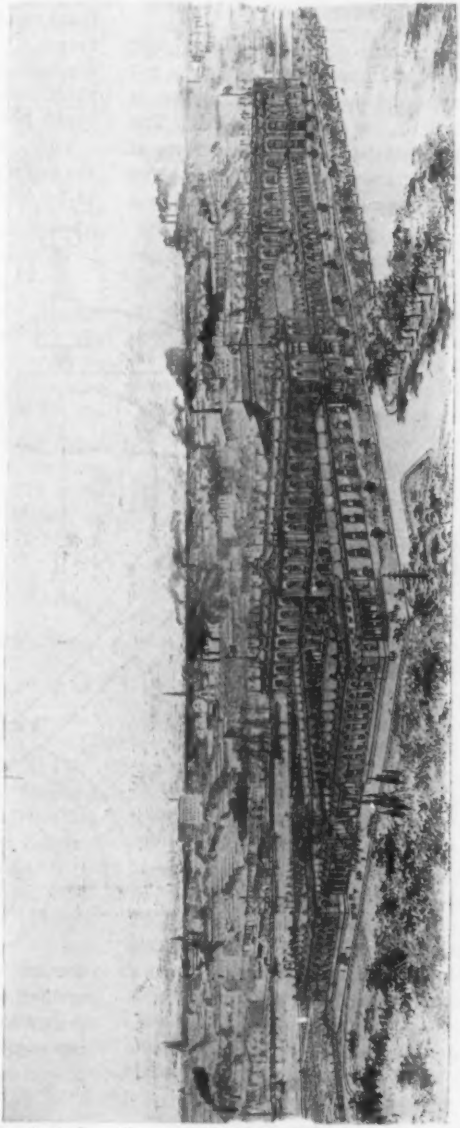
The Philadelphia Exposition.

The national exposition of American manufactures, especially suited for export trade, the first of its kind ever held in this country, is to take place in Philadelphia, from September 14 to November 30, of this year. This exposition is held under the joint auspices of the Philadelphia Commercial Museum and the Franklin Institute. It is endorsed by the congress of the United States, the legislature of Pennsylvania, and the councils of Philadelphia, all of these having made liberal appropriations towards the buildings, which will be largely added to by private subscription.

We give, herewith, an illustration of a perspective view of the exposition buildings and surroundings, located on the west banks of the Schuylkill River. The buildings are to cover an area of more than eight acres. The second international congress will convene at the exposition buildings, and will be more numerously attended, and on a much larger scale than that of 1887. The important commercial nations of the world will be represented by especially appointed governmental delegates, besides representatives of over three hundred of the large foreign chambers of commerce of Latin America, and elsewhere, all prepared to discuss the commercial conditions affecting trade relations between the United States and the countries represented. These foreign buyers in the markets, which should be accessible to American goods, will find prepared for their inspection at the exposition, an epitome of the products of this country, of the highest grade and quality, which American genius, skill and experience can produce. Samples of similar competing wares from Europe, for the purpose of comparison and study, will be exposed to view, for the object of illustrating the superiority of Ameri-

can goods, to foreign buyers. $50,000 have been appropriated by the United States Congress, for the purpose of these trade samples.

The great practical result of the exposition will be to bring together the American manufacturer and the foreign buyer, whom it is designed to interest in American machinery and products. For this reason, American manufacturers should place before these perspective buyers the best possible display of their goods, and be represented at the exposition by the head of the house, the manager, or employee best qualified to secure trade. There will be opportunities for the discussion of all practical problems with the men most interested in their solution, these exhibits being solely in the interest of American manufacturers and producers. The exhibits will be principally of manufactured goods and products of the United States. It is the design of the exposition management to secure the exhibition of every line of manufacture and product which at the present moment is in demand, or for which a market can be developed. Everything will be thoroughly and systematically classified. Especial effort will be made to aid the American manufacturer, in showing how his goods should be packed, labeled, and put up for shipment, in order to meet the approval and requirements of foreign trade.



MAIN BUILDINGS OF THE PHILADELPHIA EXPOSITION OF 1899.

—In the higher commercial school in Japan, students are taught all the everyday methods and forms of Western business by actually practising them in a large room, in a make-believe way, but with exact observance of detail, as if genuine transactions were really being carried out.

—Spain was a country that early practised the printer's art.

COTTON DEPARTMENT.

Cotton Combing.

ARTICLE IV.

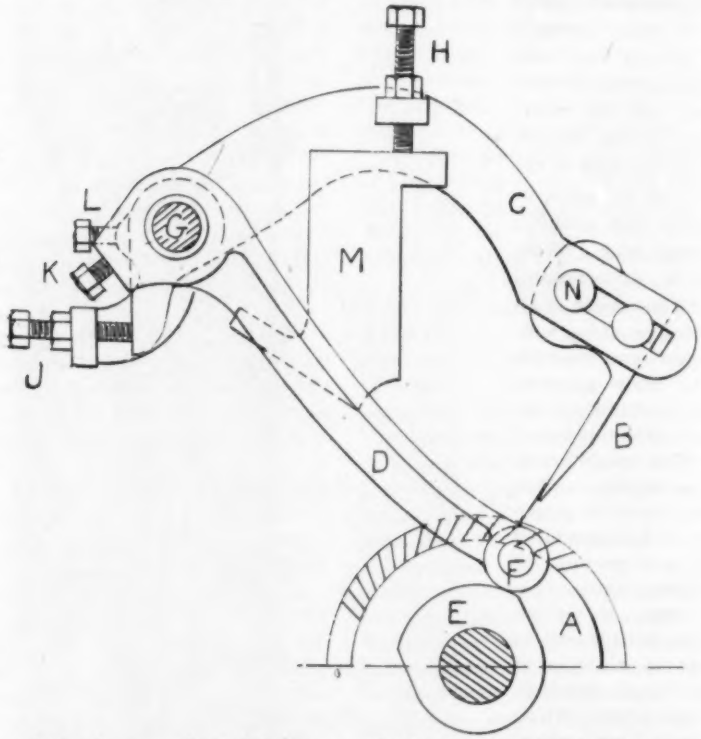
The combing of the fibre is effected in two ways, the portion which is fed through and held by the nipper is combed by the cylinder needles. The cylinder consists of seventeen rows of needles screwed onto flat plates. The needles are round steel, tapering to a fine point and are graduated down as shown by the following numbers:

6 rows of No. 20 needles.
4 rows of No. 26 needles.
3 rows of No. 28 needles.
2 rows of No. 30 needles.
2 rows of No. 33 needles.

17

When the needles are broken out or bent over, these flat plates which are screwed onto the cylinder may be removed and new needles soldered on. Good combing can only be obtained by keeping these plates well filled with needles and periodic cleaning out of short fibres, neps, dirt, etc., which the brush has failed to remove.

There still remains the portion of the lap which was held by the nippers to be combed, and this is effected by the leather detaching roller to be described in a later article. This roller draws the end of the lap through the top comb shown in Fig. 7.



A. Cylinder.
B. Top comb.
C. Top comb lever.
D. Lever.
E. Cam.
F. Cam bowl.
G. Spindle.
H. Stop screw.
J. Stop screw.
K. Stop screw.
L. Stop screw.
M. Stand.
N. Top comb stud.

The top comb B, is fastened to the lever C. by studs N, which regulate the angularity of the comb. The end

of the lever C, is secured to the spindle G, by set screws. The limit of the range of movement of the top comb B is regulated by the stop screw J, which passes through a bracket. The stop screw H, is for the purpose of setting the top comb to the cylinder needles. Motion is imparted to the top comb by the eccentric E on the cylinder shaft, and as the bowl F is carried by the eccentric it can easily be seen how movement is transmitted to the top comb. This cam is so constructed as to keep the top comb raised out of the way when the cylinder is doing its work, but drops as soon as the needles pass and thus the lap is drawn through the comb by the action of the detaching roller.

The needles generally used for the top comb are No. 28. In setting the angle of the comb, great care must be exercised to get both ends alike and the proper angle for the waste we are to take out a good average being from 28° to 31°. From the cylinder needles to the top comb we must set to a 19s gauge for good results. The timing varies from 5¼ to 5½ or just before the detaching roller drops.

COMBER.

Automatic Conveying from Store House to Picker Room.

Paper read by E. W. Thomas at the April meeting of the New England Cotton Manufacturers' Association.

At a meeting of the New England Cotton Manufacturers' Association held at the Profile House in September, 1896, the writer presented remarks relating to a new system introduced at the Tremont & Suffolk Mills for automatically conveying cotton from the store houses to the various picker rooms. The system at that time had been in operation but about six months, and our brief experience with it up to that date seemed to warrant its permanent success. Now after two years' service with it I am glad to say that with certain improvements we find it today fully up to our original expectations.

In response to inquiries from different sections of the country asking as to the successful operation of the system, it has been suggested that any additional information be given.

At these mills there are three picker rooms with self feeds and openers in them, each room being supplied from pipes leading to various store houses. I will take but one of these picker rooms, containing fifteen sets of self feeds and openers. This room is about 900 ft. away from the store house that supplies it. About 900 bales of cotton are used weekly in the room, and inasmuch as the warp and filling cottons are different in their class, we have two complete systems of pipes and fans running from this room to the store house. This is done also that both classes of cotton may be run to picker at the same time, having at the same time an opportunity of crowding one line should anything happen to the other one.

As stated before, the nearest point between the store house and picker room is about 900 feet. The store house, or more properly speaking, houses, are of wood, one story in height—about 24 ft. high, 330 ft. long and 75 ft. wide. Each of these buildings is divided into five compartments by brick walls extending above the roof and beyond the line of the outsides of the buildings. These cross walls have no openings in them. The two buildings are about 18 ft. apart, and the two sides next this passage way are of brick with two doorways into each compartment. Through this passageway between the buildings is the spur track upon which cars laden with cotton are received. In the end compartment of one of these buildings all cotton required for each two days' consumption is taken, and the covering and hoops removed. The ends of the two pipes previously referred to have funnel shaped mouths into which the cotton is thrown.

The tubes are 18 inches in diameter and pass under a public street, through the basement of a mill, then rise to the second floor of another

mill. At this point are located the fans that suck the cotton from the store house from this point on. The cotton after passing through the fans is blown to the picker room through pipes of the same size.

As the pipes enter the picker room, cotton passes through about forty feet in length of dust trunks of the ordinary make, except somewhat narrower. These are fully protected by automatic sprinklers. At such points along the rear of the self feeds as are desirable are located condenser heads —the design of these being to allow the air that has been drawn over with the cotton to be removed by a system of piping connected with an exhaust fan and discharged into dust room below. This allows the cotton to fall directly to floor without being blown about.

Advantages of the system:

First. A minimum quantity of loose stock in the picker room at any one time, as but just enough cotton may be maintained on floor to feed into openers.

Second. All the advantages of airing the cotton by opening the bales in the store house may be had that are in the picker room.

Third. The saving in handling the bale beyond the placing in the opening room and saving of transportation that involves either trucking by hand or by teaming.

Fourth. A better condition of stock fed into openers, as it is thoroughly broken up and loose and in good shape for the self feeds and openers.

Fifth. No special necessity for the store house to be placed adjacent to the picker house, for it may be quite remote, and the system is perfectly practicable within reasonable limit.

Sixth. The position of the exhaust fan or blower may be at the store house, part way along the line of conveying pipe, or at picker end at a point wherever power can be readily and conveniently obtained.

We do not claim originality of this system, as our friends the woolen manufacturers have used it for years in conveying stock both wet and dry, but adopted and applied it as a labor saving device. In these days of close competition we are forced to adopt any and every means of reducing expense, by the introduction of any and all improvements that are practically of an economical nature.

Answers to Questions Set by the City and Guilds of London.

ROBERT CUNLEFFE.

Question: Describe the method of balancing the counter-faller wires in a mule, and say how they are prevented from coming into contact with the threads during the period of spinning.

Answer: The counter-faller wire in a mule is placed under the yarn, while the winding-faller wire is placed over it. If the winding is slack at any part of the stretch, the weights on this faller immediately pull up the wire, thus preventing snicks. Or, if the winding be rather tight, the wire is pressed down, thereby giving compensation to prevent the yarn being broken. At certain distances on the counter-faller shaft are placed sectors, or sections, of pulleys, about six to seven in the length of an ordinary sized mule. On the sections of pulleys are placed the ends of chains, the other ends passing through weights, which are fulcrumed on the underside of the mule carriage. The end of the chain passing through the weight has a thread with a nut, so that the height of the weight can be regulated. These weights are not required to act as the carriage is making its outward run, so they are kept from pressing upon the chain of the counter-faller by another nut or button at the bottom of the winding faller chain. As soon as the winding faller is pulled down by the backing-off chain, the weight is then allowed to rest on the nut of the chain on the counter-faller, and thus turns the shaft, raising the counter-faller wire until it comes into contact with the under side of the yarn. This action is maintained until the winding of the stretch is complete and the fall-

ers unlock. These weights are technically called salmon-head levers. On each of these heads is a stud, on which are placed loose weights, so as to put a greater or less tension on the yarn, as required. In spinning coarse counts a greater number of these loose weights are required than when spinning fine counts.

Question: What is the nosing motion used upon a mule, and why is it needed?

Answer: The nosing motion on a mule is an apparatus to regulate the speed of the spindles when winding on the nose of the cop, so as to form a solid, firm cop nose. It is needed because the quadrant, as left by Roberts, its inventor, was unable to give the proper speed to the spindles, as the carriage was reaching its inward runs and the winding reaches the nose of the cop. The necessity is caused on account of the blade, or winding part of a mule spindle, tapering from about 1/3 inch diameter to 1/16 inch diameter. It follows that, in order to wind the yarn on the nose of the cop in all its stages equally close and firm, the velocity of the spindles at the termination of the inward run of the carriage should be suited to the diameter of that part of the spindle on which the nose is being formed. What is wanted, therefore, is something which shall continue or supplement the ordinary accelerating function of the quadrant, so that its action will be suited to the constantly diminishing diameter of the spindle on which the cop nose is being wound. This object is attained by different methods. Most firms accomplish this object by an apparatus which deflects the winding chain, just before the carriage has finished its inward run, thus causing the spindles to turn at an accelerated speed. One firm, at least, accomplishes this object in quite a different manner, by the application of a scroll on the end of the winding drum. As the cop becomes gradually built up higher on the taper spindle, more winding chain ought to be uncoiled from the scroll, until, at the completion of the cop, the chain should be wholly uncoiled. It should be understood that the velocity of the winding increases in the same ratio as the diameter of the scroll decreases from which the chain is uncoiled.

Question: Describe the construction of the governing or strapping gear of a mule, and say how it acts.

Answer: The governing or strapping motion of a mule is for the purpose of regulating the speed of the spindles during the winding on of the yarn. It is constructed as follows: Inside the quadrant arm is a screw, on the screw a nut which is on one end of the winding chain. The position of this nut on the screw governs the winding. The nut is at the bottom of the screw at the commencement of a set of cops, and reaches the top when the full thickness of the cop is attained, or, in technical language, when the bottom is finished. At the bottom of this screw is a bevel wheel, which is driven by another bevel wheel. On the stud is a pulley around which works a cord extending underneath the carriage to a carrier pulley at the back, and then to a pulley placed inside the carriage. Just over this pulley is a chain coming from the finger on the counter-faller shaft. If the yarn is being wound on too tight, it depresses this finger and the pulley is made to move, causing the cord to turn the screw in the quadrant arm, thus raising the nut, and causing the spindles to turn slower during the winding on. Most of these motions act as the carriage is making its inward run, though in other cases it is not altered until the carriage has made its outward run. In the opinion of the writer, this is very objectionable; the alteration ought to take place as soon as ever the yarn is being wound on so tight as to bring the counter-faller low enough to turn the cord referred to above.

Question: What is the construction

of single and double rings used in spinning? How are they respectively fixed to the rails?

Answer: The rings here referred to are of course connected with the ring and traveler frames. They are fixed in the ring rail which moves up and down, so as to wind the yarn on the length of the bobbin. The single rings are constructed with two flanges, one very fine, or thin,—one end of the traveler hooking in it and traveling around it,—the other, being broader, rests upon the ring rail. Below this there is formed a special surface in order to fit into a slot prepared for it in the ring rail. A very small screw passes through the ring rail, and holds the ring firmly in its position. The double rings are constructed on similar lines as the single ones, except that the flanges are made one at the top and another at the bottom for the purpose of carrying the traveler. This is for the purpose of reversing the ring when one of the flanges gets worn.

Question: By what means is the traverse of a ring rail obtained, and what part of the mechanism determines its relative velocity at various periods of the traverse?

Answer: The traverse of a ring rail is obtained as follows: The twist driving wheel on the stud is the twist wheel, which drives two large carrier wheels, which drive the wheels on the front rollers. On the same stud as one of these carrier wheels is a single worm, driving a small worm-wheel on an upright shaft. At the bottom of this shaft is another small worm-wheel, gearing into a much larger one, on the stud of which is the heart cam. This cam gives motion to a lever which is fixed underneath it, and this lever gives motion through a chain fixed to the end of it and passing over a pulley, the other end being fast to a quadrant. At right angles to the quadrant is the poker bar, which lifts the poker, it being attached to the ring rail. At the end of the lever on which the heart cam works is the builder wheel and its gearing. It is arranged that as the lever lifts after being depresed by the heart cam, the catch pushes the builder wheel around one tooth, and winds the chain up a little on to a drum behind the builder wheel, thus lifting the ring rail, so that the winding on the bobbin will be a little higher each upward and downward movement. It will be understood that when the lever is pressed down by the heart cam it takes the lifting or traverse rail to the top. Then when the heart cam turns over and the thin part is on the lever, the rail comes down by the action of its own weight, and at such a speed according to the outline or shape of the heart cam. The cam is so designed that the rail descends much more quickly than it ascends. So this gives the answer to the latter part of the question, that it is the outline or form of the heart cam which determines its relative velocity at various periods of the travel.

Question: A twist wheel is required to spin 40s counts, the twist being 23.72 per inch; the wheel is worked by a worm on the rim shaft; the rim shaft runs at 700 revolutions per minute; the spindle speed is 8400 revolutions, and the stretch is 64 inches; what size of wheel would you require?

Answer: The spindles will be required to turn around each stretch ($64\times23.72=1518.08$ times. Now the twist wheel being driven by a single worm from the rim shaft, it follows that the number of revolutions of the rim shaft will be equal to the number of teeth moved by the twist wheel in a minute, namely, 700. So $(1518.08\times700)\div8400=126.5$ teeth in twist wheel. Or, as the spindles turn round 12 times for the rim once, then $(23.72\times64)\div12=126.5$ teeth in twist wheel.

Question: Suppose you begin with a drawn sliver, .158 hank, and produced a slubbing 1.5 hank; two ends of slubbing put through the intermediate frame give a 3.5 hank; and two ends of intermediate through the roving frame give a 9 hank roving; what

are the drafts in the slubbing, intermediate and roving frames, respectively?

Answer: 1.5÷.158=9.48 draft in slubber. Now, as two of these 1.5 hanks were put up together at the intermediate, it would be 1.5÷2=.75 and 3.5÷.75=4.66 draft at intermediate. Now the 3.5 are doubled at the roving frame, so 3.5÷2=1.75 and 9÷1.75=5.08 draft at roving frame. It should be noted that the draft 9.48 in the slubber is much too great. In the first place the hank of sliver is too coarse, it should be about .18; and the slubber is too fine, it should be about .75. In that case the draft would be .75÷.18 =4.16, which is a proper draft for the slubber. However, the examiner puts the question as given above, and of course it must be worked out.

Metallic Fluted Rollers.

If a pair of metallic fluted rollers of a given diameter revolve at say 100 revs. per min., they will deliver more sliver than the same diameter of an ordinary pair of rollers. The increased amount will depend upon the depth of the flutes.

If the fluted rollers deliver more in length, then a given twist per inch will require that a quicker speed of spindle must be given than would be required for ordinary rollers running at the same speed. The introduction of metallic front rollers means that for the presumed increase in production, the spindles must be made to revolve quicker, or, if the spindles are not altered, the front rollers must be slowered. Since, with ordinary rollers, the same increased production could be obtained by speeding up both spindles and rollers, the only advantage of metallic rollers is that the wear and tear of a few revolutions of the front roller is reduced.

On the other hand, since the crinkled sliver gives rise to a presumed increase of production, it follows that, length for length, the crinkled sliver will be of a lower hank; to get the same hank sliver delivered we must use a finer sliver behind and so reduce the production or keep the same sliver and speed, the metallic roller thus obtaining an increased production. Speeding an ordinary pair of rollers would give us also an increased production.

If metallic fluted rollers deliver crinkled sliver, which, whilst nominally longer than would be delivered by ordinary rollers, results in a lowering of the hank of the delivered sliver, then the speed of spindles requires to be slowered to get the correct twist per inch corresponding to this lower hank; no benefit therefore results.

If front rollers are metallic and back rollers not, the front rollers deliver more length but the back rollers must be increased in speed or else the draft between them will be increased; if an increase of draft is not wanted, the front metallic rollers must be slowered.

With back and front rollers both metallic, increased length is delivered, but subject to the crinkles being straightened out or remaining as crinkles, this advantage is neutralized or modified, whether in Drawing Frames or Flyer Frames.

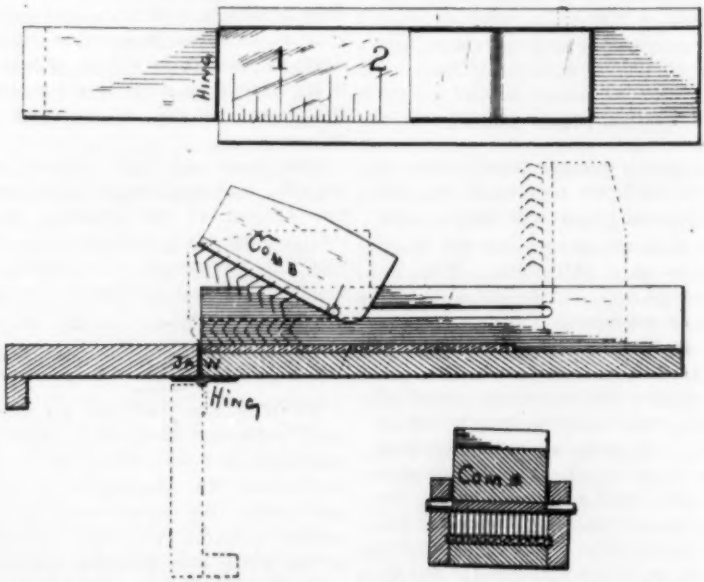
Device for Measuring Fibres.

We illustrate, herewith, an apparently ingenious device for measuring the length of cotton fibres, or the cotton staple. The instrument is especially devised for the use of buyers and sellers of cotton, whereby the length of the staple may be easily determined beyond dispute, the seller knowing exactly what he disposes of, and the buyer being equally certain of what he purchases. The commercial value of this instrument lies in the fact that the price of cotton depends, oftentimes, largely upon the length of the staple.

We furnish, herewith, three illustrations, or drawings, showing a plan of the apparatus, a cross section of it, and also a longitudinal section. The apparatus consists of two nearly abutting parts, hinged together. On one

of the parts is to be seen a scale with its divisions. Over this scale is fixed a smooth, transparent plate. One of the abutting parts swings downward, so that one end of the sample of cotton may be inserted between the jaws, between the parts, where it can be firmly clamped and held in position. The free portion of the sample may then be bent over the other part, and, if it be drawn out straight, the scale shows the entire length of the fibre.

As a convenient means for drawing the staple out straight, along the side of the scale there are two side pieces, upon which are mounted a sliding



combing device. This latter consists of a comb, or card, fixed to a block, fitting loosely between the side pieces. The block being pushed away from the jaws referred to, and the staple of cotton being inserted, as noted, the block may be held in an oblique position and carried forward over the staple, and then dropped to the position shown in the dotted lines on the left, in one of the figures. If, however, the block be moved without raising, the staple is combed out smooth under slight tension on the scale, lying beneath the plate, showing the length of the fibre. The staple may be combed out any number of times, or different samples may be substituted and measured in rapid succession.

Dressing Cotton Sail Cloth.

It is a fact generally appreciated that cotton sails which have not been impregnated or dressed will, if allowed to remain wet, or, worse still, if furled whilst in a wet condition, before long exhibit spots or patches of mould which can never be completely removed by washing and scouring with soda and soap, or even with bleach and acids, but still remain after the operation, their presence being unpleasantly manifested by numerous little black specks.

On the other hand, if the sails are—as they should be—immediately taken down and exposed to the drying influence of wind and sun, this evil can be avoided. and on large ships this precaution is rigidly observed. Where it is neglected, as is most frequently the case in small sailing and pleasure boats, the warmth generated in the furled sails co-operates with the moisture in facilitating the development

of mould nourished by the materials ordinarily used in dressing the cloth.

Provided the danger is recognized at once and the sails immediately well scrubbed with soap, and dried, then further injurious consequences can be obviated, even though it may not be feasible to entirely prevent spotting. Usually, however, the practice followed is to merely swill the sail with water alone, and leave it to dry in the sun, the result being that the sail becomes quite rotten in the mould-infested parts, and is consequently spoiled.

To prevent this unwelcome occurrence it has become the custom of many makers to dress the cloth with metallic salts to prevent the development of mould. The ordinary dressing applied by the weaver plays an important part in mould formation, since it has been found that sail cloth entirely free from such dressing will remain free from mould a much longer time than that dressed in the ordinary manner when exposed to the same conditions—i.e., rolled up whilst wet, and kept in or out of the sun. Hence it is necessary to remove this dressing before proceeding to impregnate the cloth with the new one. This operation is most satisfactorily accomplished by boiling with malt, which can, however, be replaced by caustic soda or water-glass. The goods coming from the loom are sewn together, four to six pieces in one, according to their length and thickness, and are then boiled.

Take, as an example, goods of which each piece is 32 yards long, 24¾ inches wide, and 13¼ pounds in weight. Six pieces are sewn together, and then boiled in the jigger along with a solution of ⅓ ounce of malt per 0.22 gallon for one hour. The pieces are afterwards left rolled up for six hours, then rinsed, entered eight times in a bath of ¼ per cent. Be. (cold) hydrochloric acid, and washed on the full-width washing machine until all traces of acid are removed; they are then hung up to dry, without wringing. It is important that the goods should be dried in this manner instead of in the drying cylinder, the wringing necessary previous to the last-named process causing the goods to suffer in feel and appearance, a condition to which the rapidity of the drying also contributes.

If caustic soda be employed, the six pieces are boiled for one hour with 33 gallons of water and 7 ounces of 77 per cent. caustic soda, after which they are washed, acidified with ½ per cent. Be. hydrochloric acid (lukewarm), washed in water until the acid is entirely got rid of, and then dried as above. A fresh extracting or boiling-out bath is required for each fresh set of six pieces, but the acid bath can be used over again after it has been made up to the requisite strength of ½ per cent. Be. once more.

If water-glass (alkali silicate) be used for the boiling-out bath, then 33 gallons of water and 3⅓ pounds of 66 per cent. water-glass are taken for the six pieces, which are boiled therein for one hour, and subsequently treated as in the preceding case. The water-glass bath must be renewed for every set of pieces treated. As far as the washing out of the acid is concerned, this is only essential when stress is laid on the cloth being of very good color, and since the hard and close material parts with the acid with difficulty, the protracted operation of washing can in many cases be dispensed with.

In the boiling-out process each piece loses between 14 and 18 ounces in weight, and shrinks in width, the shrinkage being, however, inconsiderable when the cloth is dried by hanging, though a greater loss in width is experienced when the drying cylinder is used.

For dressing or impregnating the washed goods they are passed through a padding machine provided with two rollers, the upper one of metal and the lower one of compressed paper pulp. The trough is fairly large, and is provided with several guide rollers, over which the

cloth is passed, the excess of dressing liquid being squeezed out by the machine rollers. To avoid pressing the goods and disfiguring their appearance a light pressure only is employed.

The dressing bath is prepared from 66 pounds of alum, dissolved in 40 gallons of water, 27½ pounds of acetate of lime being then introduced, with continued stirring. After settling, the clear liquid is drawn off, the sediment swilled out, and the wash-water used to dilute the bulk to 5 per cent. Be. The liquor is employed at this strength, and is kept at a temperature of 30° C. by indirect steam throughout the operation.

After the pieces have been thoroughly and regularly soaked through —which usually necessitates their being entered two or three times into the bath,—they are hung up to dry at a temperature of 40 to 45° C., the acetic-acid vapors being carried away by the aid of a fan.

The next stage is to fix the dressing with water-glass, for which purpose 33 gallons of water and 18 ounces of water-glass are required for each set of six pieces. The goods are entered six times, at boiling temperature, in the jigger, then rinsed and hung up to dry. For each succeeding set of six pieces the bath is regenerated by the addition of 7 ounces of water-glass, and after five such sets have been treated it is discarded and a fresh bath prepared.

Caustic soda is preferably used for boiling out the goods in the first place, since it facilitates the removal of the seed cases of the cotton which are generally found present in the cloth. If these seed cases are allowed to remain behind, they will swell up in the subsequent dressing-bath, and becoming compressed and flattened out during the passage through the squeezing rollers of the padding machine give rise to the formation of ugly red-brown stains on the material.

The cloth weighing, as stated, 13.25 pounds as it comes from the loom, decreases to 12.32 pounds after boiling out, the final weight after dressing being 13.6 pounds. It will keep for a considerable time, but the dressing should be renewed at intervals, if the sails are in constant use. Moreover, the sails require careful handling, since, if the alumina is removed by rubbing or tears in the cloth, such places are liable to become mouldy if carelessly treated.

The author states that he has used the foregoing method for some time, and has never had any complaints of the sails getting mouldy. To renew the dressing on a sail that has been in use for one to two years, the best plan is to soak it in a vat filled with a 3 per cent. Be. solution of acetate of alumina. For large sails which require a considerable quantity of the liquid it is best to lay the alumina solution on with a brush, and then dry the stretched sail; fixing with water-glass is then unnecessary.—Farber Zeitung.

—According to the 1898 report of the Labor Bureau of North Carolina, there seems to be an abundance of mill labor in the State, and employees in the cotton mills are better satisfied than any other class, and there is no antagonism between the employer and the employed.

—Concerning the educational qualifications of employees in the cotton mills of North Carolina, it is said that 89 per cent. of the adults and 69⅛ per cent. of the children, read and write.

—When steam traffic has been established on the lakes in Hunan, China, and on the Upper Yangtsze, a share of the large native trade may be expected to come by steamers; at present there is no customs trade whatever between the open ports of Shasi and Chungking.

—The most striking feature of the higher commercial school in Japan is the enterprise displayed in teaching foreign languages, and this is due mainly to the enthusiasm of one man, Kanda Naibu, lately made baron on the death of his (adopted) father.

WOOLEN DEPARTMENT.

Ingenuity in Modern Textiles.

CHARLES E. WILES.

ARTICLE V. (Continued).

(Copyright.)

There is an average assortment of styles for trouserings which are woven from warp flush weaves such as buckskins, upright twills and sateens, to which a distinctive feature is imparted by the inclusion at suitable intervals of a cord or rib effect. In the majority of cases this rib simply runs in a longitudinal direction along the piece, but a few patterns have it in the form of a check, which latter scheme, providing the squares forming the checking be of reasonable dimensions and both ribs developed to an equal degree of strength, is often attended with interesting and useful results.

A satisfactory though somewhat elementary type of the former make is given in Fig. 19, the ground face and backing plans being shown at 19A and 19B. The ground effect in each division of the stripe is varied by reversing the direction of the twill, and the cord appearance is obtained by flushing what have hitherto been backing picks over the warp threads. Where this is done it will be seen that the other picks are wadded between the face and backing warps, floats of the latter being stitched in a straight twill order.

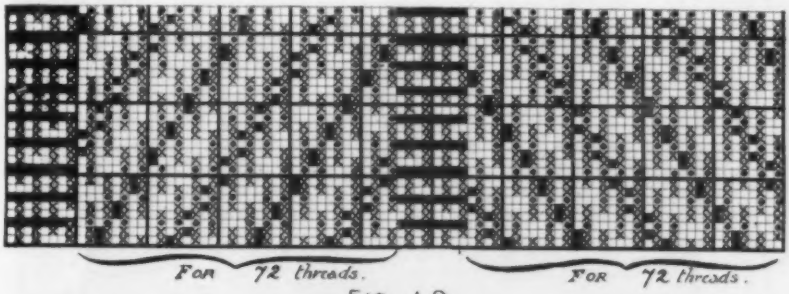


FIG. 19

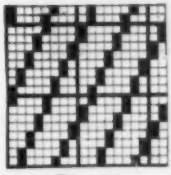


FIG. 19A

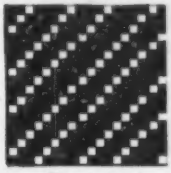


FIG. 19B

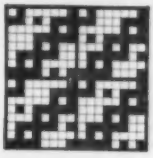


FIG. 21

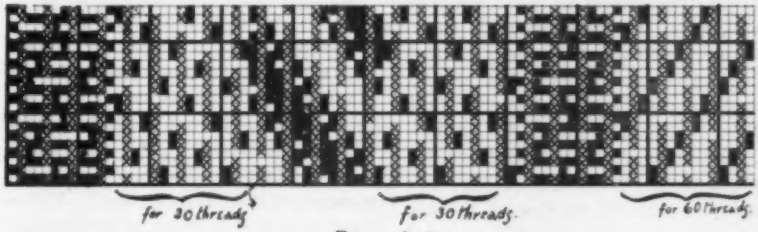


FIG. 20

If both ground sections of the stripe are required to exhibit equal clearness in weave effect, it will be necessary to have the warp yarn twisted in a contrary direction in one portion to what it is in the adjoining one; should this not be done, the crossings in one section will appear almost obliterated, whilst in the adjacent section they will come up with an emphasized degree of clearness.

Weaving particulars for design 19 are here appended:

Warp:
All 2/50s worsted—dark brown mixture.
188 reed 8s.

Weft:
2/80s worsted—dark brown mixture.
144 threads and 150 picks per inch.

The next design, Fig. 20, which is single in the weft and double warp ways, is a combination of cord effect, warp-faced twills and a fancy twill, presenting, when properly woven, a fabric full of variety as regards weave detail, even if almost solid in color, and one which should prove a fruitful object lesson in the method of setting out plans composed of three or four different makes. When fully extended, the complete design occupies 159 threads and twenty picks, but this somewhat unusual number of threads may easily be altered to suit personal requirement by the addition or withdrawal of some of them. This should preferably be done in the present example at the last section of the plan, which is composed of the five shaft Venetian weave; but care should be exercised to finish the weave in a position which will fit with the adjoining section when the pattern is repeated.

The following data for weaving Figure 20 are suggested:

Warp:
1 thread 2/50s worsted—dark brown shade —for face.
1 thread 2/25s worsted - dark brown shade —for back.
1 thread 2/50s worsted—dark brown shade —for face.
For 42 threads.
1 thread 2/48s worsted and silk twist—for face.
1 thread 2/25s worsted—dark brown shade —for back.
1 thread 2/50s worsted—dark brown shade —for face
For 15 threads.
1 thread 2/50s worsted—dark brown shade —for face.
1 thread 2/25s worsted—dark brown shade —for back.
1 thread 2/50s worsted—dark brown shade —for face
For 102 threads.
22s reed 68.

Weft:
All 2/50s worsted—dark brown shade.
132 threads and 96 picks per inch.

FIG. 228.

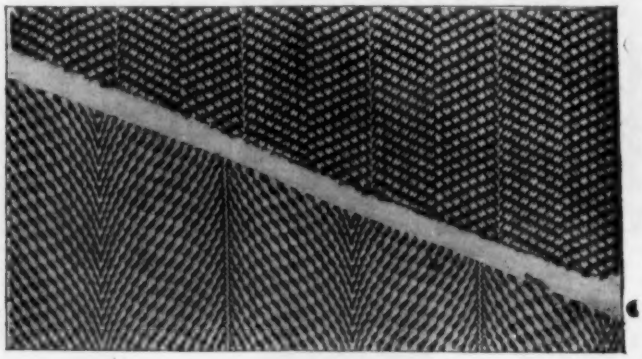


FIG. 29.

Shaded effects in stripes for trouserings are usually entirely due to the employment of different colors of yarn in the warp, success depending upon the taste displayed in the selection of fresh looking contrasts and also in the manner of their arrangement. Unless close attention is given in preparing a range of this class, there is considerable likelihood of a disagreeable streakiness being produced by the occurrence of unequal patches of color. Simple makes are employed for weav-

ing these styles, the weft generally being a solid, dark shade.

In order to illustrate the preceding remarks, particulars are here appended which have been taken from an excellent example of this particular branch of designing; the cloth itself was double in structure, being woven from the two and two twill, one face and one back in both warp and weft. The weave is given at Fig. 21, and the arrangement of threads for the warp is as follows:

1 thread 11 dram silk—light lavender shade.
1 thread 2/50s worsted—light lavender shade } for 8 threads.
2 threads 2/50s worsted—dark blue gray shade.
4 threads 2/50s worsted—light lavender shade.
2 threads 2/50s worsted—dark blue gray shade. } for 24 threads.
6 threads 2/50s worsted—light lavender shade.
2 threads 2/50s worsted—dark blue gray shade. } for 16 threads.
10 threads 2/50s worsted—light lavender shade
2 threads 2/50s worsted—dark blue gray shade. } for 24 threads.
6 threads 2/50s worsted—light lavender shade.
2 threads 2/50s worsted—dark blue gray shade.
1 thread 11 dram silk—light lavender shade.
1 thread 2/50s worsted—light lavender shade } for 6 threads.
2 threads 2/50s worsted—dark blue gray shade.
6 threads 2/50s worsted—light lavender shade.
2 threads 2/50s worsted—dark blue gray shade
10 threads 2/50s worsted—light lavender shade. } for 24 threads.
2 threads 2/50s worsted—dark blue gray shade. } for 16 threads
6 threads 2/50s worsted—light lavender shade.
2 threads 2/50s worsted—dark blue gray shade. } for 24 threads.
4 threads 2/50s worsted—light lavender shade.
2 threads 2/50s worsted—dark blue gray shade.

17s reed 8s.

Weft:

All 2/50s worsted—dark blue gray or black.

136 threads and picks per inch.

Another example of the combination of weave and color to produce a stripe is given in Fig. 22. The face pattern, shown in Fig. 22A, is constructed from a derivative of the common six-shaft twill, three up, three down. By rearrangement of the threads and the addition of a back texture made from another 6 shaft make, renders the fabric double in structure. Solid marks indicate the surface weave, dots the back cloth and crosses hide the backing threads by lifting face picks over them.

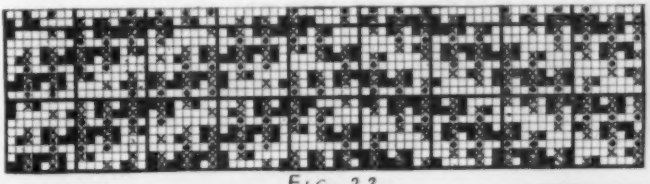


FIG. 22

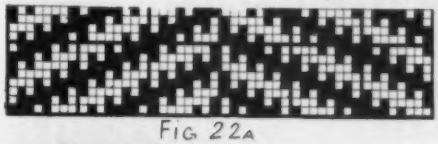


FIG. 22A

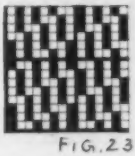


FIG. 23

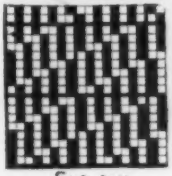


FIG 24

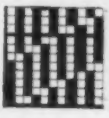


FIG. 25

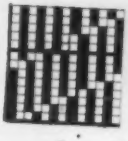


FIG. 26

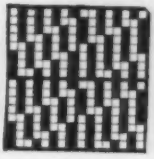


FIG. 27

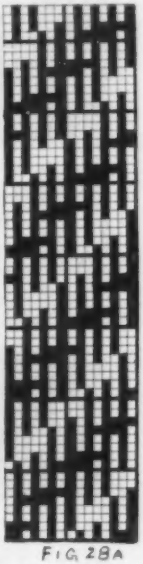


FIG. 28A

The order of coloring which has been adopted here and which produces the effect illustrated at Fig. 22B, is as follows:

Warp:

for 6 threads.
1 thread 2/48s worsted—tan brown—for face.
1 thread 2/48s worsted—white—for face
1 thread 2/48s worsted—tan brown—for back

1 thread 2/48s worsted—white—for face.
1 thread 2/48s worsted—tan brown—for face.

1 thread 2/48s worsted—white—for back.
20s reeded 8s.
Weft:
2 picks of 2/5's worsted—for face. } all
1 pick of 3½ skeins wool—for back. } black
160 threads and 90 picks.

Corkscrew Styles: Some of the most novel patterns in worsted fabrics result from combinations of weaves of the corkscrew class, these being generally produced in warps arranged thread and thread as regards color. One or two standard corkscrew weaves, or "round twills," as they are often termed, are illustrated here in order that the principles governing the construction of such makes may be rendered more comprehensible. Figs. 23, 24, 25 and 26 represent the seven, nine, eleven and thirteen shaft makes, respectively, whilst Fig. 27 serves to indicate how variations may be produced, obtaining two or three different sizes in the twills. The latter weave is complete on 16 threads and 8 picks. When correctly woven, a fabric made on a corkscrew base has no weft visible on the face, and from a momentary consideration of the plans just given it will be readily understood that if the warp is arranged one thread dark and one thread light, the effect in the fabric will consist of alternate solid stripes of dark and light running diagonally across the piece.

There are almost innumerable modifications bearing on this principle of cloth construction extant, and in some cases a high standard of ingenuity is exhibited by the way in which weave and threads have been manipulated in the production of preconceived effects.

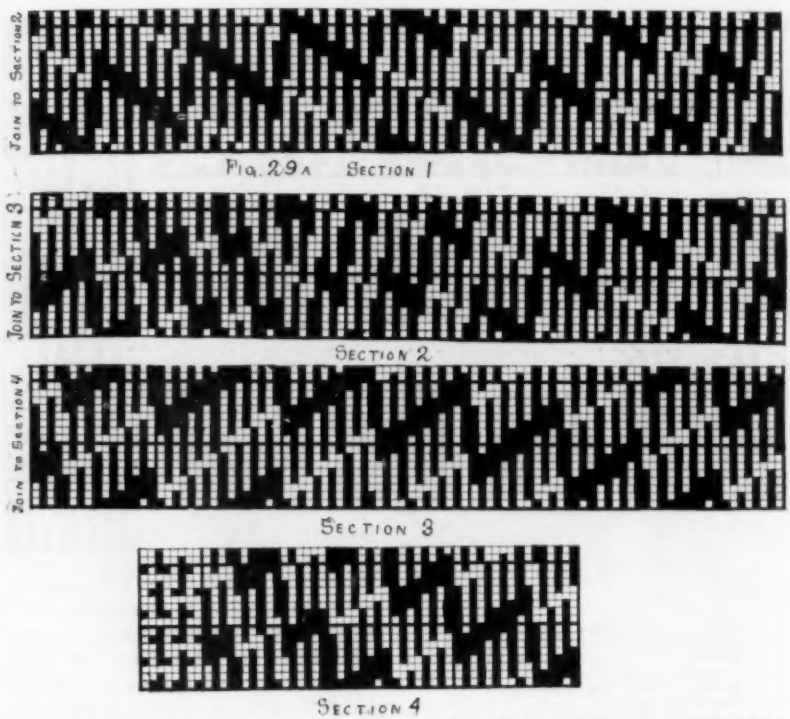


Fig. 29A Section 1

Section 2

Section 3

Section 4

Fig. 28 has been photographed from a fabric of this kind, and although there is a certain stiffness apparent in the color portion of the pattern, the scheme of its construction may be instructive. The weaving plan is complete on fifteen shafts, and sixty picks are required to one round. It is woven with about 190 threads and 175 picks of 2/60s worsted per inch, the general order of threads in the warp being one

dark brown, one light and the weft all dark brown. To produce the broken effect seen in one portion of the stripe —the order of threads is reversed every ten, e. g., the warping would be one light, one dark for ten threads, then one dark, one light for ten, and so on, the change being effected by bringing two dark threads together, thus throwing the colors into the reverse twills. The smartness of the texture is enhanced by tying in a few silk threads of contrasting color.

As affording conclusive demonstration of the possibilities, this method of cloth building holds out at the hand of the skilled craftsman, the very ingenious production shown in Fig. 29, selected from a collection in "Les Tissus," has been included, but the photograph fails to do justice to either the neatness or smart appearance which char-

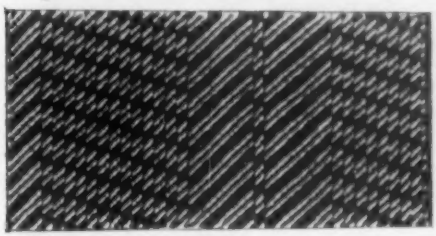


FIG. 28.

acterizes the woven specimen. The weaving plan, No. 29A, as also the particulars which accompany it, are here reproduced and will render more evident the care and skill which have been brought to bear upon the execution of a pattern deserving of prominent recognition in a review of ingenious textiles.

The warp is arranged thus:

2 threads 2/50s worsted—black.
1 thread 2/50s worsted—lavender shade.
2 threads 60s 2 fold silk—lavender shade.
1 thread 2/50s worsted—lavender shade.
2 threads 2/50s worsted—black.
1 thread 2/50s worsted—black.
1 thread 2/50s worsted—lavender shade. } for 152 threads.
1 thread 2/50s worsted—black.
1 thread 60s 2 fold silk—lavender shade. } for 16 threads.
1 thread 2/50s worsted—black.
1 thread 2/50s worsted—lavender shade. } for 152 threads.

17s reed 88.

Weft:

2 picks 2/50s worsted—dark lavender shade.
1 pick 10s worsted—dark lavender shade.

136 threads and 112 picks per inch.

Owing to the large number of threads occupied, the design has been divided into sections, all marks indicating weft up, and the complete pattern being weavable on twenty-eight shafts.

Fancy or Novelty Yarns.

There seems to be a natural inclination for the mind to consider how a change, improvement or something new may be produced in every department of life. It shows itself in the effort of the social leader, to spring some agreeable novelty on the admiring attention of her friends; in the flaming advertisement of the theatrical manager, and the continuous performance of the amusement hall. It is the reason why an engine should be tried, why a carriage should be bought, and all along every line of mechanics and industry the same struggle goes on to add to and increase business at home or abroad. "We have something here what you want; you can't afford to do without it; it is up-to-date; it is a novelty."

An old authority denied the existence of anything new under the sun, but if that is correct it would seem as if the knowledge of much that we call new must have been destroyed long before the authority referred to put down his statement. To speak, therefore, of a novelty as applied to the textile manufacturer is a natural thing and harmonious with the regular course of things as applied to dress for men or women. That women demand more radical changes, greater extremes in color, material and form is so plain a fact as to need no special mention. This circumstance probably was to a degree clear and understood in Solomon's time.

For the purpose of this article, therefore, we will simply consider the use of novelty or fancy as applied to the yarns used in the construction of

fabrics for men's and women's wear.

We all know that once on a time, such covering as men had was the spoil of some wild animal or the leaves of trees, but there came with advancing civilization knowledge of better things and as the distaff gave way to a succeeding form of thread manufacture—so the original loom worked by hand, was driven away by the application of power and the multiplication of means, made possible the use of new or unknown materials in addition to the fleece of the camel and sheep—which once were perhaps the sole materials, but other fleece bearing animals as the goat, llama, vicuna, also fur bearing creatures of many kinds besides the cotton plant, flax, ramie, the silk worm, etc., etc., and even metals all contribute of their yield to the growing demand for new material and each adds its varying value.

The great bulk of material however, is from the fleece of the sheep, of the goat, the silk worm cocoon and the cotton plant. It is then in the method of use and combination of these few materials that the greater part of the "style" of our fabrics for dress is produced. Assuming then that plain or self colored fabrics are not concerned in this matter, although real novelty is often shown in such productions, it is to show how the use of fancy yarns may change this plain ground cloth into a high novelty.

For men's wear goods the use of cotton is generally forbidden, but no restriction is placed in making something for women's wear, and many an inferior stock holds exalted place during its brief reign. It is not the purpose of this article to explain methods or machines used, for this would publish the results of a lifetime's experiment and means used which, while still pursued, are many times more often failures, than profitable successes.

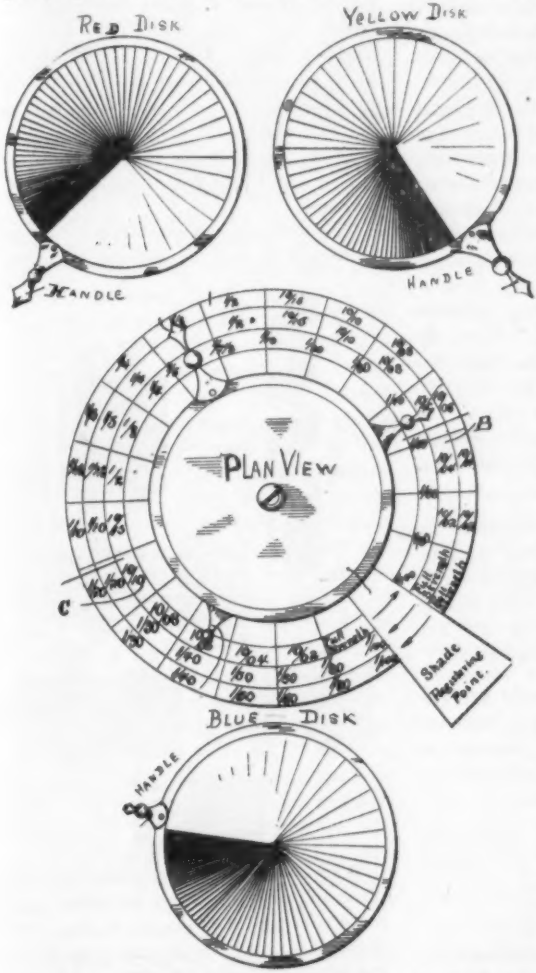
The purpose in using cotton yarn in making fancy yarns is three-fold,—for economy, fineness and strength, as in many yarns a great amount of twist is needed and worsted or mohair would not bear so much without injury. Cotton is mainly placed in the foundation or base, and the worsted thread twisted upon it and then a fine cotton thread again added for the purpose of fastening the effect and to prevent slipping. A so-called fancy yarn may be a perfectly plain double and twist, or the proportion, size, etc., so delivered as to produce loops, knots, slubs, or caterpillar effects, curls or spirals. Again such effects may be dependent in some cases upon subsequent processes of scouring or finishing in the cloth and have very little appearance of such effect when first made. Many yarns require to be dyed either before or after weaving to bring out their full effect and to the dyer also belongs much of the care and perfection of fancy yarns, that the lustre of the material is preserved or improved.

Mohair, which is from the angora goat is obtained in Turkey, South Africa and some of the Western States, but the best lustre, and in this consists its value, is found in the Turkey hair of good breed and quality. Certain sheep produce excellent lustre wool and frequently compare well with mohair, but may lack other qualities which go to make it a material standing by itself, subject to its own peculiar treatment to produce and develop its value.

Fancy yarns, then consist of such combinations of mohair, wool, cotton, etc., as will make striking effects in the way of lustre, color, or figure in the goods. These are obtained by twisting together, and by many other forms of combination, coloring, before or after combining. It is not intended to say that such methods or means as are referred to are all, but that they indicate some ways to the end in view. As all cloths are not finished alike so the make of yarns may have had some process in the early stages of preparation or blending of the stock, which being developed in the fabric pleases the eye but gives no clue to how it was made.

Color Shade Finder.

There have been a number of devices which are described in books and elsewhere, for getting at, mechanically, the shades of different colors. We illustrate with this a new device, or apparatus, for determining the proper proportions of the primary colors in order to obtain any desired shade. This apparatus can, by proper manipulation, produce any given shade, by the combination of the three primary colors—yellow, red and blue. Briefly stated, the instrument consists of three sheets of gelatin, or equivalent translucent or transparent material mounted on a base, and so mounted as to pass one over the face of the other, the base having a scale properly divided for getting the proper proportion of each color on the respective sheets. This will be observed in our illustration, giving a plan view of the apparatus. In the drawings, A, B and C designate concentric circles secured to the base of the device in any suitable manner, A being the outer circle, which gives proportions of yellow; B, the central circle, giving the proportions of red; and C, the inner circle, giving the proportions of blue; each circle being graduated from the one-hundredth part to the full strength of the color used.



The yellow disk is located on the apparatus under the other two disks, and the blue disk is on top. The yellow is imprinted on the paper, and the red and blue on celluloid, gelatin, isinglass, mica, glass, or other transparent or translucent material that allows the colors to blend or mix. The imprinting is accomplished by halftones, gelatin-printing, photolithography, or other process. The yellow disk has the longest handle and corresponds with the outer circle, around which it rotates. The red disk has a central handle, which corresponds with the central circle, around which it rotates. The blue disk has the shortest handle, corresponding with the inner circle and around which it also rotates. These levers when moved to give any given shade, rest on figures which give the proportions of color or colors required in blending or mixing the

same. The uppermost figures on these circles represent the proportion of color to be used, and the undermost figures represent the proportion of reducing-ink to be mixed with the same. The shade-registering point gives the desired color, the handles indicating the proportions of color by which it is blended. These disks are centrally pivoted to the framework or base of the apparatus, and are rotated through the medium of the handles, as aforesaid.

Each disk is graded from the lightest to the deepest shade of the color on it, and the arrows at the shade-registering point indicate in what direction the sheet is to be moved by its handle in order to go from the lightest shade to the full strength of the color.

—C. A. Allen, for 30 years overseer of spinning in the No. 3 mill of the Hamilton Mfg. Co., Lowell, Mass., has resigned owing to poor health. His help presented him a cane and pipe. James Davis, formerly overseer for the Appleton Co., has accepted the position.

—J. H. Hines, superintendent of the Fulton Bag & Cotton Mills, Atlanta, Ga., has accepted a similar position with the Manchester Mfg. Co., Macon, Ga. He was presented by his employees with a fine smoking case.

—T. H. Wilkinson, formerly superintendent of the Mississippi Mills at Wesson, Miss., has been engaged as superintendent by Messrs. Oliver Lupton & Co., of Philadelphia.

—William Hinchcliffe, for many years superintendent of the Dallas Mfg. Co.'s mill, Huntsville, Ala., has resigned.

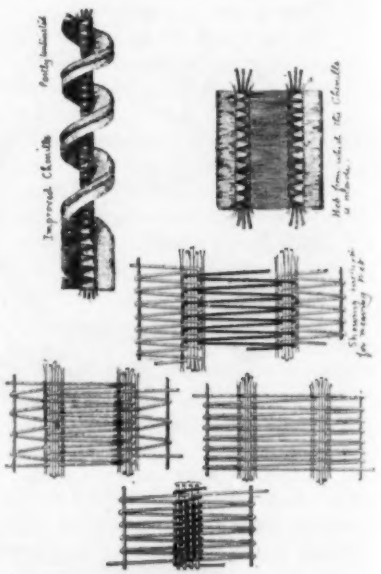
—Thomas Nelson has succeeded J. T. Broadbent as clerk in the office at the Lowell Textile School, Lowell, Mass.

—Alfred H. Ryan has resigned as superintendent and designer for the James G. Knowles Woolen Co., New Castle, Del.

Chenille.

We illustrate, herewith, a new method for the making of chenille, which many of our readers will undoubtedly recognized as a good thing, as suggestive, if nothing more. One of the objects of this method of making chenille, is to produce a woven strand having a heavy centrally incased core, from which the chenille yarns project. Another object aimed at, is to provide a core with a chenille in which uncut loops alternate with a cut fur, and a still further object is to provide uncut loops of one color, or shade, and a cut fur of another color, or shade.

The methods for attaining these objects will be well understood by refer-



ring to the illustrations, which give a piece of chenille partly untwisted; a piece of the web from which the chenille is made; a diagram showing the method of weaving the web; and similar diagrams illustrating certain modifications which will be understood by those familiar with the manufacture of chenille.

The improved chenille fabric consists of a central heavy incased or inclosed core, from which project uncut

chenille loops and a cut chenille fur, which in the twisted chenille form spiral convolutions, with the uncut loops and the cut fur lying side by side, the core being exposed between the convolutions when the chenille is not tightly twisted. In producing chenille of this character, there are employed two bunches of heavy core-strands, separated from each other in the loom to the desired extent and each flanked by sets of fine warps, the loom being also provided with selvage wires or warps, as shown in the method of weaving.

When it is desired that the uncut loops of the chenille shall be of a color or shade different from the cut fur or pile, three sets of wefts are used. The wefts are shot back and forth between and around the bunches of core-threads, so as to be wrapped first around one of these bunches and then around the other, and are interwoven with the inner sets of fine warps. The wefts are each shot between and around one of the bunches of core-strands and one of the selvage wires or warps, so as to pass alternately around the same, and these wefts are interwoven with and bound by the outer sets of fine warps, as will be fully understood on reference to method of weaving, the result being the production of a web as shown in the completed web, which is then divided on the central longitudinal line, so as to produce two webs, each with a central core inclosed or incased by the weft-yarns and having on one side projecting uncut loops, and on the other side a projecting cut fur or pile, which, when the chenille is twisted, will produce the effect shown in the strand of chenille.

If desired, more than two sets of chenille-wefts may project from the central inclosed or incased core of the chenille by simply increasing the number of wefts employed in the weaving, and by employing a multiplicity of selvage-warps the projecting chenille yarns may form a pattern instead of presenting plain, straight edges, as shown.

Mechanical Draft.

The elaborate Treatise on Mechanical Draft recently issued by the B. F. Sturtevant Co. of Boston, Mass., is unique as a trade publication in that it presents no personal claims for the merit of the system or the apparatus necessary for its operation, but relies solely on the statements of unbiased witnesses to emphasize its features.

For this reason, the following quotation from this important work is of especial interest and value. It consists of a summary of the especial advantages of Mechanical Draft as presented by the well known engineer, Mr. Alfred Blechyden in a paper before the British Institution of Mechanical Engineers. He says:

"First, it seems fairly well established that, if the boilers are well constructed and are provided with ample room to insure circulation, their steaming power may without injury be increased to about 30 to 40 per cent. over that obtained on natural draft for continuous working, and may be about doubled for short runs. Secondly, such augmentation is accompanied in normal cases, by an increased consumption per indicated horse power. But, thirdly, the same or even greater power being indicated, it may, with moderate assistance of forced draft, be developed with a smaller expenditure of fuel, the grates, etc., being properly proportioned. Fourthly, forced draft enables an inferior fuel to be used; and, fifthly, under certain conditions of weather, when with normal proportions of boiler it would be impossible to maintain steam with natural draft, the normal power may with forced draft be ensured. In particular cases any or all these advantages may be a source of economy; and the first of them may render possible that which would otherwise be impracticable."

KNITTING DEPARTMENT.

The Knit Goods Situation.

The opening of summer has brought no great changes in the knit goods situation. But for a few seasonal shifts, positions have not altered materially within a month.

The closing days of April were so warm as to bring a grist of small reorders on light weights, with a consequent stiffening of prices. Up to that time, a decided lagging tendency was noticeable.

Notwithstanding this spurt, spring and summer specialties have in several instances proved distinctly disappointing. This is peculiarly true of golf hose. In the first place the spring was backward. Last season, dealers generally overloaded, forgetting the limited demand for such goods, also their experience with fancies, so recently. Between these two factors and minor influences, widespread weakness is apparent. There is small need, however, of holders of good stock getting scared, for eventually they are sure to pull out without loss.

Fancy hosiery is in better condition than could be expected, considering the forced sales of large lots within a few weeks, which went far below cost. At such prices, of course, they were readily absorbed, but the demand has now been answered for six or eight weeks to come. Importers are feeling it severely, but they are meeting it squarely in a way that ought to teach the domestic trade a lesson. Thus far they have granted no appreciable concessions to stimulate trade.

In this connection, a word of caution is due on lace hosiery, for which there is still brisk demand, although it is to be noted that cancellations are creeping in upon foreign manufacturers. The experience on these goods is likely to be very much like that on fancies.

Fine gauze hose, mostly for women's wear, is in small, but steadily increasing request, that is almost sure to make present low prices more than firm in the near future.

Generally speaking, foreign advices on hosiery are not strong, there having been but few advances of late and those small. Still, it is to be remembered, that this is never a promising period.

In fancies, Chemnitz reports a slackening on striped designs which are being crowded aside, for the time being, at least, by embroidered styles, etc.

Seamless hosiery, in a word, may be said to be in as healthful condition as any branch of the domestic trade; too many mills, however, are turning in that direction.

It should be remembered, also, that there is a limit in the market for specialties, which cannot be forced even at sharp sacrifices.

Full fashioned goods are steadier.

Speculation is rife in underwear circles about the proposed combination, cold water being mostly thrown on the plan, as might be expected at its present stage. It is the much-desired individuality that has brought about the largest share of cut throat competition. Close combination appears to be out of the question. If a few simple agreements can be reached by the more important manufacturers, the movement will be amply justified and the way paved for moderate extension of uniform action.

Fewer drives than usual at this season are seen in foreign underwear. Importers have, in fact, entirely changed their business methods within three or four years, and have now fairly begun to reap their profits thereon. Their fall orders are alike gratifying in quantity, quality and price.

Bathing suits were never before offered in such variety and elaboration.

Mercerized goods, interwoven with wool yarns, which give the rich effect of silk, are in increasing display; their price, however, is too high to make an extensive appeal. With improved processes, their introduction cannot fail to widen.

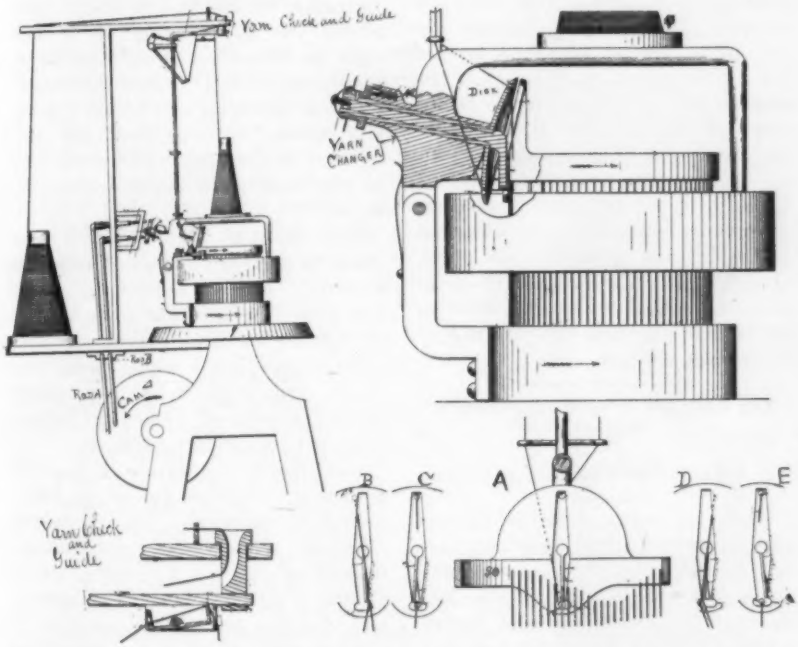
Ribbed goods are in continuous call, but some mills have so long juggled with their prices that they are deriving little advantage therefrom.

Flat goods are as much demoralized as ever, by the craze for fleeces, which must be near its height. Indeed, even with the present rush, fleece manufacturers who have bid low for business, are beginning to suffer; one does not like to think what will happen when the crowd turns its back on cotton fleeces, now being so readily tried.

By way of general characterization, it may be remarked that the trade is in as hopeful condition as at any time the last six months, and considers the prospects equal to any within as many years.

Automatic Yarn Changer for Circular Knitting Machines.

We illustrate the mechanism of an automatic yarn changer, for circular knitting machines, in which the yarn changer rotates with the cam ring. Our illustrations represent a side elevation of a portion of a circular knitting machine, to which has been supplied the mechanical device; a vertical section of the yarn check and guide; a side elevation of the upper portion of the knitting machine, the yarn changer being shown in vertical section; and vertical section (A), of the latch guard, showing the inner face view of the yarn changer, and the



relative location of the needles, and inner face representations (B, C, D, E) of the yarn changer in its various positions.

The knitting machine shown in the drawings, in the main, is of an old construction, and consists of a bed, standards, cam ring, needle cylinder, and pattern wheel. The means for rotating the cam ring and for imparting an intermittent rotary movement to

the pattern wheel are not shown, as it is evident that such movements may be imparted in various ways.

The yarn guide has a vertical central opening, its lower end coming out of the side of the shank. A horizontal opening is formed through the shank of the guide, which is located centrally over the needle cylinder. In changing from one yarn to another, the yarn to be used must be moved into engagement with the needles before the other yarn is thrown out of use. This is accomplished by the employment of a disk, having the holes near its upper and lower edges. This disk is supported by the ring cam, and is moved bodily around the needles, and when the pattern wheel has revolved to bring one of the cams against the rod A, the prongs supported by the rod will be moved into the path of the arms of the spider; and by the bodily movement of the spider, the arms of the latter will come in contact with the prongs, which will revolve the spider a little more than one-half a revolution to the right; and when the rod B is moved by another one of the cams, the prongs will engage the arms of the spider and revolve the latter in the reverse direction, and return it to its original position.

The Past and Present of Chemnitz Hosiery.

A WINK OR TWO AT THE FUTURE.

From the introduction of hosiery making down to 1840, only one hose was made at a time. (Parenthetically one may put in that the date when the first pair was made goes back beyond whither the memory of man runneth). The one-at-a-time making machines were wooden, made in "forty-eleven" little places among the mountains. The fitting with needles, in fact the finishing or fitting up of the machines was looked after by Limbach and Chemnitz technicians or mechanicians. These machines were as simple as goodman Lee's "looms." The threads had to be put over by hand. The artificial, self-acting, mechanical thread-thrower came later. For a long time (happy times) the production was confined to houses in the hills; humble houses they were too. How happy those times were is one of the things that old timers take great delight in telling. Usually a master knitter worked with one or two apprentices. Time never hung heavy on anyone's hands. There was free trade, if laissez faire means anything; for master and men let each other do pretty much as they pleased. Mondays were usually "blue" and Tuesdays, too, were often taken up with getting over the good time had on Saturday night and Sunday. Wednesday work went on for all it was worth. Ofttimes Thursday, Friday and Saturday saw master and men making up in the night for the neglect of the other days, particularly when orders "pressed." The dull monotony of the day's work was relieved by song, sad, gay and serious. The women, whose work was to spin and spool, sang accompaniments.

The knitting industry took the place, in part, of the ancient spinning industry. It was hereditary. Sons saw how their sires did it, took to it as children and grew expert. At first only coarse goods came from the frame. This seems to be the normally natural growth of almost all industries, not excepting agriculture.

Sometime in the thirties, fine goods got going. This was due to the finer, improved machines. The enormous difference is shown by the following interesting fact. A factor from Gruena ran in one day to Hohenstein and offered a merchant a quarter of a dozen pair. Think of it, a factor to march all the way up or down from Gruena to Hohenstein to show and sell three pairs of machine made hose. Now there are machines that turn off twelve and sixteen at once. Where it was a factor with three pairs each, in the past, on which they made more than modest profits, one sees Gruena sending huge wains or wagons full to Hermsdorfs to be dyed or to Hohenstein to be packed. The house or

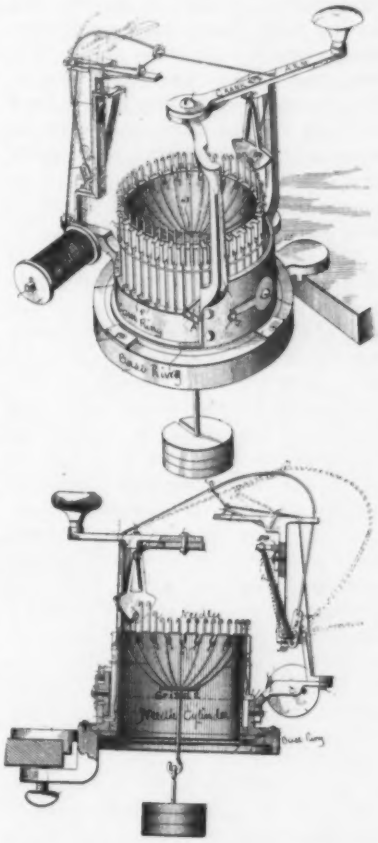
home industry is passing away. For good or evil the men of the mountains are going up into the big mills, into the miles of brick and mud, among the dark streets, the crime and shame and sin of big cities. It is inevitable, perhaps, but not better, not good. What the end is to be would be hard to predict. There is no reason for thinking the world worse off now than it was then. For the hundreds that had good stockings then, millions have them now. I'm not sure that it would be wise to go back into the past. There was lots in it with which we would find it hard to get along. Whether we will or not, we can't. The wheel of progress is a ratchet wheel, it never turns backward. The methods employed, here, in the manufacture of knit goods should encourage the men in Massachusetts, Rhode Island, all over New England and in New York, who have gone in for hosiery, underwear and gloves. What has been done so successfully on this side can surely be done among your people. Push, patience, progress.

BROWN.

Circular Knitting Machine.

We give, herewith, two illustrations representing new contrivances for a circular knitting machine, primarily contemplating means for rotating the cam ring, or head, in either direction, without the use of a cog gearing or other devices usually resorted to for imparting motion. The brief description that we will give of the principal features, together with the drawings, will enable practical knitters to have a clear conception of their purposes. The upper illustration is a perspective view of a circular knitting machine, while the lower illustration is a vertical sectional view, at one side of the plane of the yarn carrier. The horizontal base-ring of the machine has provided, at one side, a clamp, by means of which the machine can be readily secured to a table, shelf, or similar support.

The horizontal base-ring of the machine is formed in its upper side with an annular guide rabbet or groove, and has fastened to its upper side and at the inner peripheral edge thereof, by means of screws or similar fastenings, the lower end of the upright needle-cylinder. The needle-cylinder is thus rigidly connected with the base-ring, so as to form a stationary part of the machine. The needle-cylinder is of the ordinary construction, being provided in its exterior face with a circumferential series of vertically-disposed needle channels or grooves in



which reciprocate the vertically-movable knitting-needles. The knitting-needles are retained within their guide channels or grooves in the ordinary manner, and are provided at their lower ends with the usual outwardly-disposed heel projections, which travel

on the track formed by the upper edge of the cam ring or head.

The revoluble cam ring or head loosely encircles the needle-cylinder at the lower end, and is provided at its lower edge with an outturned bearing-flange, which loosely registers in the annular guide rabbet or groove, formed in the upper side of the base-ring, and the bearing-flange of the cam ring or head is detachably retained within the rabbet or groove by means of a plurality of retaining-plates, detachably secured on the upper side of the base-ring by means of screws, and having their inner edges overlapping the peripheral edge of the flange. The mounting of the cam ring or head in this manner permits this ring or head to freely revolve or rotate around the stationary needle-cylinder, while at the same time permitting the ready removal and replacing thereof whenever necessary.

The upper track edge of the cam ring or head lies for its greater portion in a horizontal plane, but at one side of the ring or head is downwardly curved on the arc of a circle, as noted at A, at which point the ring or head has rigidly fastened to the outer face thereof a segmental cam-supporting plate, to the inner concaved side of which cam-supporting plate are fitted needle actuating or controlling cams.

In operating the machine the crank arm or lever is grasped and thrown against a stop-arm on the crank-supporting bracket, and since this bracket is rigidly connected with the cam-ring, a continued pressure on the crank arm or lever will provide for the rotation of the cam ring or head, and a consequent operation of the needles to provide for knitting the fabric.

In the operation of the machine it is necessary to keep the fabric properly stretched, and to provide for this a work-holding spider is employed, essentially comprising a plurality of radially-disposed curved hook-arms, radiating from a common center and provided at their outer terminals with hooks, engaging with the fabric, all of which can be seen in the illustration.

Knit Goods Covered with Fur, Etc.

An ingenious method has been the subject of a recent invention for the incorporation with a knitted fabric as a base, of a superficial layer or covering of down or fur, for the production of a finished article of beauty and utility. This fabric is intended to serve as a substitute for the natural skins of down-bearing birds, and of fur-bearing animals, which are largely employed in the manufacture of wearing apparel, at a greatly reduced cost. The range of the applicability of this textile is wide.

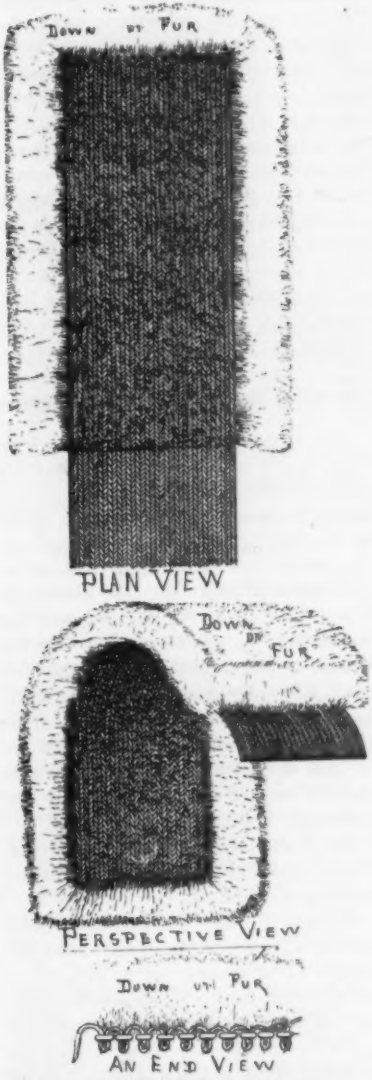
We give, herewith, a plan view, a perspective view, and an end view of the fabric.

Heretofore feather trimming has been made, or attempts have been made to produce feather trimming, by interweaving the membrane or quills of feathers, with the barb or vexilla attached thereto, into a fabric with which the membrane or quill is incorporated. Such material, however, besides being comparatively costly to manufacture, differs from the present material in many respects, but more particularly in the absence of the downy appearance exhibited in this fabric for which fur or down can be incorporated to excellent advantage.

The distinguishing characteristics of the present fabric are due to the fact that a uniform covering for the fabric base is produced, or a covering which is substantially of the same degree of thickness or homogeneity throughout.

In order to make clear how this fabric is produced, we will state that a knitting-machine or loom of any preferred description is utilized. During the knitting operation there is provided in close juxtaposition to the needles or web-forming mechanism, a loose mass of fur or down designed to be incorporated with the fabric, confining the mass in its loose state in such a manner as will keep the upper thread, as shown in the end view, constantly working among the mass in such a manner as will cause it to take in each bend or loop

that it makes in being incorporated into the web a small quantity of the hair or downy filaments that constitute the mass of down or fur in which the thread works. The fur or down is fed solely by gravity to the needles or web-producing mechanism, so that the



web is formed, as it were, in an atmosphere of down or fur out of which it continuously feeds and incorporates with itself a portion. In the manner described the hairs or downy filaments are severally caught up and confined within the loops of which the web 2 is composed, and produces upon the surface of the web so fashioned the downy or furred layer as seen in the illustrations. After the web, with its covering is formed, all loose particles of fur or down not incorporated with or properly adherent to the fabric may be driven away, as by an air-blast or other means.

In some instances it might be advantageous to employ unshrunken shrinkable thread in the manufacture of the textile base or backing, and after the down or fur is incorporated with such base or backing to shrink the fabric, as by wetting. By this means an exceedingly strong adherence between the material and its backing may be secured.

It is not new, however, to weave into a fabric base a covering of loose wool or similar material. This process, however, is distinguished from the present one, and the article produced is distinguishable from the one referred to here, because of the coherency of wool on the one hand and the segregated or disconnected character of down or fur on the other hand. In operating upon a coherent mass, like carded wool, for example, the filaments of the wool being connected and adherent throughout the mass, it is not only possible but necessary to present the wool to the knitting mechanism in a positive manner by the employment of a positive feeding mechanism. Now in the treatment of down or fur, each filament being separate, the material cannot be presented to the knitting mechanism except in a loose mass. Consequently there is a clear distinction in the character and appearance of articles produced by incorporating carded wool or the like with a fabric base and by incorporating loose down or fur with a fabric base. In the former the filaments of wool lie along and close to the fabric, while in the latter the individual hairs project severally at an angle from the fabric.

Knitting Machine.

Some recent improvements have been made in knitting machines, that have become subjects for letters patent, applicable to various forms of knitting and other machines, which we can allude to only at this time by description, designed more particularly for application to what are known as "straight-knitting" machines, and especially to that form in which two rows of needles are employed that are inclined to each other, and in which the needles of each row in their operation are reciprocated across the needles of the other row, as in what is known to the art as the "Lamb knitting-machine," the objects of the invention being to provide a machine of this class in which the several operations of knitting stripes in the article or fabric being produced at predetermined intervals by a supplementary yarn, of knitting welts in the article or fabric at the required places, of widening the article or fabric at the proper places on one or both edges to fashion the same for its intended use, and of stopping the machine at a predetermined point in the knitting of the article or fabric, and when the tension upon it is reduced below a certain limit, or otherwise may be automatically accomplished, and the delivery of the yarns to the needles during the knitting operation more efficiently controlled.

To these ends the contrivance consists, first, in the guides for the main and the supplementary yarns, and in the means whereby the one is automatically brought into and the other carried out of operation, and vice versa, as the knitting of the plain or body portion of the article, or the stripes therein may require; second, in the needle-operating cams and in the means whereby one of these cams may be automatically carried out of and brought back into operative connection with its appropriate row of needles, as the knitting of a welt or the plain or body portion of the article or fabric may demand; third, in the needle-lifters and in the means whereby they are automatically brought into operation to successively raise and bring into operation a needle at each edge of the article or fabric being knit at each forward and backward reciprocation of the cams to effect the widening thereof, and automatically carried out of operation when the widening of the article or fabric is not required; fourth, in the stopping mechanism and in the means through which it is put into operation to stop the movements of the machine at the required time or under certain predetermined conditions; and fifth, in the peculiarities of construction of the yarn-controlling devices, whereby the yarns at certain portions of the travel of the needle-operating cams are positively held, and at others are left free to pass to the needles.

Fraud in the Sale of Woolen Goods.

We have referred, in previous issues, to the attempt by the legislature of Connecticut, to enact a law for the alleged purpose of preventing fraud in the sale of woolen, shoddy and cotton goods. A petition to this effect was introduced at the last session of the Connecticut legislature, but the committee to which it was referred reported unfavorably, and the bill that was prepared was rejected by both the House and Senate. In order that our readers may see the character of the designed legislation, we give the act in full as sent to us by the Secretary of State.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. Any person or persons who shall manufacture, sell, offer for sale, or exchange, any yarn, knit, woolen or felted fabric, or article designed for clothing to wear, and made in part or whole of wool, cotton or shoddy, shall cause the same to be tagged, labeled, or stamped with statement in the English language of the portion of each material entering such article or fabric.

Sec. 2. The terms wool and cotton as herein used shall be construed to mean new fibres such as have not before been used. The term shoddy shall be construed to mean any of the materials known commercially as shoddy, noils, and wastes.

Sec. 3. Any person or persons violating the provisions of this act, shall for the first offense be fined twenty-five dollars, and in default of payment thereof be imprisoned thirty days; for any subsequent offense said fine and imprisonment shall be doubled.

Sec. 4. The duties of the Dairy Commissioner shall extend to and cover violations of this act, the same as provided by law for the inspection of dairy and food products, and the same laws governing the prosecutions or violations of the law regulating the manufacture and sale of adulterated articles of food or drink, shall extend to and cover any violation of this act.

Sec. 5. This act shall take effect and be in force on and after January 1st, 1900.

Flexible Skin or Fabric.

There are several methods for making skins and fabrics flexible for various uses, as substitutes for leather. We believe it has been satisfactorily demonstrated that naphthol is an important ingredient in flexible pyroxylin compositions containing camphor. It is found that by dissolving pyroxylin in a mixture consisting of a suitable oil, a liquid solvent of pyroxylin and naphthol a product is got which can be combined with coloring-matter and then spread upon leather, cloth, or other fabric to produce an article which takes the place of finished leather goods. It is essential that the solvent either consists of or contains a liquid of comparatively slow volatility and immiscible with water. This liquid must either be a solvent of pyroxylin or form a solvent in combination with the other ingredients. There are many liquids which answer this description. For instance, acetate of amyl, benzoic ether, propionic ether, capronic ether, formate of amyl, and fusel-oil, have been successfully used.

A good formula for coating a solution for cloth or leather is as follows: soluble pyroxylin, one hundred parts; amyl acetate, three hundred parts; wood-spirit, three hundred parts; castor-oil, one hundred and fifty parts; beta-naphthol, two to three parts. The proportion of wood-spirit can be varied according to the solubility of the particular pyroxylin employed, so as to make a solution suitable for spreading and, other things being equal, the proportion of oil be changed to suit the flexibility desired.

Suitable pigments for coloring can be ground in or mixed with the composition in the manner usually employed for coloring, enameling, or waterproofing mixtures.

The finished fabric is susceptible of embossing or burnishing and will remain pliable for a long time without decomposition or offensive odor.

—Cotton yarn trust will absorb large spinning mills of New Bedford, Fall River and Taunton, embracing 641,614 spindles with a capitalization in stock of $7,050,000. These plants have cost for construction about $9,000,000. They practically control the cotton yarn industry in fine and medium high grade yarns. A. B. Sanford says that the price offered for the stocks of these corporations, everything taken into consideration, is a fair and liberal one, and the stockholders will do well to accept of the offers made the trust, to sell out and take their money. This is a good opportunity for them.

—The extraordinary development of German industry during the last few years has brought about a considerable increase of female labor, as well as an increased employment of children, both in factories and in house industries.

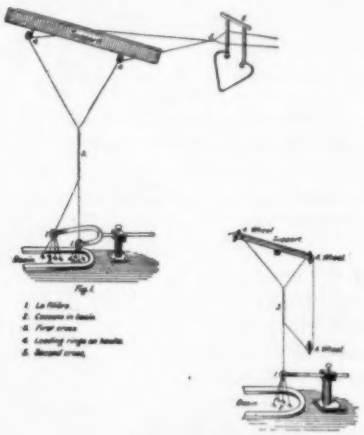
—Eugene C. Gaynor has been elected to the positions of treasurer, general manager and one of the trustees of the Miller River Mfg. Co., Athol, Mass.

SILK DEPARTMENT.

Silk.

RAW SILK — TWISTING — CONDITIONING — WASTE.

The United States consul at St. Etienne, has recently sent a communication to the State Department, to the effect that in France, as soon as the cocoons of the silk worm arrive at the factory, where they are to undergo the reeling process, they are exposed to a steam bath in an oven, in order to asphyxiate the chrysalids and thus prevent piercing of the cocoons. After this operation the cocoons are taken to the drying room where they remain three months. Another method much more rapid is that of the hot air



drying process. Exposed to a temperature of 140 degrees F. for twelve hours the cocoons become dry enough to be immediately packed. There is still another system, which is a combination of the two already mentioned; that is to say. steam is first applied to kill the chrysalids, and a current of hot air is turned on to complete the necessary desiccation.

When the cocoons are brought to the reeling factory a girl, or "fileuse," sits before a large basin made of copper or iron coated with enamel and filled with water; she throws them into the water which she brings rapidly to a high temperature by means of a steam tap. Then by the aid of a little broom formed of briar twigs, called an "escorbette," she strikes the cocoons lightly. By this little operation the outside coverings, which are considered an inferior .product, are removed. This floss silk, called "frisons," is collected in the form of cords and plunged into cold water to harden the glutinous substance. The proportion of frisons is from 25 to 30 per cent. They are taken out of the water twice a day and dried. Preference is given to the frisons coming from the spinning mills where the work is done at the highest temperature.

When the girl has sufficiently beaten the cocoons she detaches, from the broom the bundle of threads sticking to it, and seizing them in her left hand proceeds with her right to remove the loose silk (debavage). This operation consists in drawing out each thread of silk until it is perfectly free from frisons. She then fixes the thread to a hook on the basin and commences to reel.

Of late years this manual labor has been in the more important spinning mills, supplanted by ingeniously devised machinery, invented by MM. Berthaud & Fils, of Lyons, reeling from four to six threads at a time.

Taking the loose silk of several cocoons according to the size required, the fileuse joins them and passes them through the drawplate (filiere), and thus prepares two threads, which she crosses by twisting one around the other a great number of times, from 200 to 300. She separates them again, passing them through a ring on each side of the bar, and after crossing them once more she attaches them to the wheel, which she turns either by foot or by hand, and the unrolling of the cocoon commences. The wheel is usually of large dimensions, from 39 to 50 inches in circumference, though many smaller ones are used.

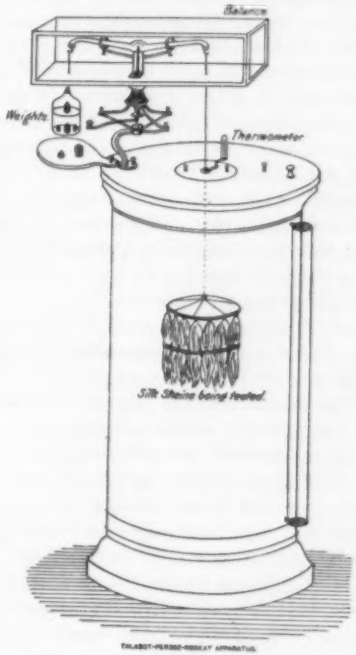
Once the wheel is put in motion, the operator keeps her eyes on the cocoons

and on the thermometer, for the water must be kept constantly at 158 degrees F. For a long time, when the thread broke while winding, the attendant simply continued her work by passing the distal end on the wheel, but now the custom is to tie both ends in a form of knot. Special girls, called "noueuses" or knotters, are told off for this purpose.

The method of folding the silk when taken off the wheel varies according to the country. In France, the custom is to make skeins by folding it into two and twisting one side over the other and then making it up into bales, when it is ready for the next operation, called "moulinage" or silk twisting.

The silk in the raw state is not twisted; it forms simply a bundle of threads glued together, and cannot be employed as such. To prepare it for the dye it is twisted, by which its degree of resistance is increased while its elasticity is diminished, and when the operation is completed it takes the name of "organsin." In the mill, the silk undergoes a double process of reeling and cleaning before being finally twisted and made up in hanks or skeins for the market.

Before the buyer will accept delivery of the silk he requires it to pass through the condition house (that of St. Etienne is very important) in order to estimate its true weight, as it is easy to increase the weight of silk by damping it with water by reason of its great hygrometric properties. However, it has been proved after long and minute observation that the silk contains normally 10 per cent. of humidity, and the work of the condition house is to reduce any excess over that standard. To effect this object, the weight of the silk rendered absolutely anhydrous is first determined, and then a quantum of humidity, which by agreement has been fixed at 11 per cent., is added. Up to 1839 the process of desiccation consisted in exposing all the silk on shelves of iron grating for twenty-four hours in a room heated to 84° F. If the silk lost from 3 to 4 per cent., the operation had to be recommenced. The results offered no security and were frequently contested. The Chamber of Commerce of Lyons improved the method, and to it is due the Talabot apparatus by which for the first time (1839) absolute desiccation was obtained. In this apparatus the silk was exposed for three hours to a temperature of 221° F., obtained by a current of steam. In 1852, M. Persoz perfected this method by a current of very hot air acting simul-



taneously by its rapidity and its high temperature. This last apparatus has been used ever since in all the condition houses throughout the country, under the name of "The Talabot-Persoz-Rogeat desiccator," and has the appearance of a cylinder of sheet iron 29½ inches in height and 16 inches in diameter.

After weighing the bale three samples of 500 grams (1.1 pounds) each are chosen—one from the top, one from the middle, and the third from the bottom of the bale. These three lots represent the hygrometric condition of the bale,

and serve as a basis for the condition test. Two of them are first placed in a receptacle, where the silk loses a portion of its humidity, and are then carried to the Persoz apparatus. Here, the silk is suspended on the arm of an extremely sensitive balance (known weights being on the other arm) forming part of the machine and covered hermetically. The silk submitted to the action of the current of hot air remains in position until the balance shows by its immobility that there is no longer any decrease in weight. The two lots of 500 grams are thus absolutely dried, and a calculation is made of the difference between the actual and the primary weights. If the hygrometric condition showed a difference of more than 1½ per cent. of one lot, as compared with the other, the third lot must undergo the same process. Finally, the absolute weight of the bale is calculated in proportion to the weights found for the samples. The duration of the test does not exceed 45 minutes, the temperature of the interior of the apparatus being kept at 248° F.

The quantity of silk passing annually through the condition house at St. Etienne exceeds 1,000,000 pounds.

After passing through the condition house, the silk is submitted to another operation called "titrage," in order to determine its quality. For this purpose, a certain number of skeins of silk, of a given weight and length, are placed upon a little wheel and pass thence to a yard windle, which measures exactly 49.21 inches in circumference, revolving around a horizontal axis. This axis is furnished with a cog wheel controlling a series of others, which, in their turn, put in motion the needle of an indicator; when the needle has executed a complete revolution, corresponding to 400 turns of the windle, a catch stops the machine instantaneously and throws the windle out of gear. The skein obtained, which measures exactly 546.8 yards in length, is weighed in a proved balance.

The third and last testing operation is that of "decreusage" or ungumming. This is effected by boiling a small sample of the silk for one hour in a bath of distilled water containing one-fourth of its weight of white soap. After the first half hour, the silk is taken out and well wrung and then put back again for another half hour of boiling, after which it is thoroughly washed in a current of cold water to remove all particles of soap that may have remained. As this operation produces a loss of weight amounting to 25 per cent., the buyer calculates his price accordingly.

Under the name of waste are comprised: The cocoons spotted or pierced, the first coverings of the cocoon (frisons), the heart of the cocoon, which on account of its extreme tenderness cannot be unraveled, and the defective portions of the raw silk removed during the moulinage and waste resulting from the different operations of winding, warping, and weaving. Nothing is lost; the products are classed under two great heads —schappes and fantaisies. The material is not carded, but combed, like flax, and finally made up into skeins. The annual consumption of floss silk in France is over 4,000,000 pounds.

—In Java and Sumatra printing is done by drawing the design upon cloth with a very small copper kettle containing melted wax. Women generally do this work.

—It was known in 1677 by the East India Company that calico was imported into England from India, to be printed upon in imitation of Indian chintz.

—In 1764 printing was established in Lancashire, Eng., in consequence of the cheapness of fuel, and of Lancashire being the county of the cotton manufacture.

—In 1700 the import of printed fabrics from India into England was prohibited by Parliament.

—In England home-printed cottons were taxed 3d. per yard in 1702, which was increased to 6d. per yard in 1714.

Hints About Silk Weaving.

E. F. F.

Of all operations and treatments, to which silk has to be submitted before it can make its final appearance in the shape of a woman's beautiful dress or on a fair damsel's hat the process of weaving is the most important one.

This is no doubt true of other fibres, as for instance cotton or wool, but silk being so much more costly than either, the care which has to be exercised in its manufacture has to be proportionately greater.

Silk is delivered to the weave rooms either on rolls or beams (the first for ribbons, the second for broad-goods), whereon the threads are assembled in their proper number and length. Heretofore, the silk has always been a thread or end, any part of which if defective could be and in truth was easily removed, without any material damage to the manufacturer. In the operation of weaving, however, where the silk, if not in reality yet practically so, changes from a fibre or thread into a solid mass or texture, and interlaces with thousands of other threads for the purpose of forming a cloth or ribbon, no defects can be removed after they once get seven or eight inches beyond the weaving pick-line. If such defects are unpleasant to look at or attract the attention of the buyer's eye, it will need but very few of them to make a "second" out of a 50-yard piece of broad-silk, and often will such a single defect change the career of a piece of ribbon by sending it to the remnant box instead of to the dry goods counter.

It will be seen that for these reasons the lot of him who receives the warps and is responsible for returning the silk thereon in the shape of perfectly woven goods, is not an easy one, and anything which tends to aid him on his difficult road is always gratefully appreciated by him. By this I mean that loom fixers and weavers, by using a little judgment of their own could ease his task very considerably. A large majority of them are willing enough and prompt enough in doing what they are told to do, but when it comes to seeing things that are wrong, as for instance defects in the weave, cross drafts in reed or harness, slack filling, anything at all, they seem to be bereft of their eyesight. This is, I think, because they were never taught to see these things in a proper light; and as I know many of them to be anxious to learn and improve themselves, these few hints are written for their possible benefit.

Returning to the time when the warps are delivered to the weaving department (I am speaking just now of a broad-silk plant), the chances are 99 to 1, that the person entrusted with such delivery, will, when arrived at his destination, take the beam off his shoulder and instead of laying it down gently, he will let it slide off his shoulder quickly, and plant it upright upon the floor. Now this might ease the man's shoulder a fraction of a second ahead of what might have been the case otherwise, but at the same time it does or at least very often does the warp irreparable injury, as through the jerk of putting the warp upon the floor in an upright position, the many layers of silk on the beam will shift their place, and when weaving the warp will not come off straight behind the cross-rods, but stick together and have the appearance of being crossed.

Very often the weaver or the warper will be held responsible for thus crossing the warp, whereas in reality it was simply due to handling the beam carelessly.

The twister who gets the warp after it is delivered to the weave room, will often do the same thing, while getting his loom ready, and loom fixers should have their eyes wide open to prevent such maltreatment of warps. The rule is that a silk warp should always be kept in a horizontal position from the time it leaves the warping mill until the beam has been emptied of silk.

The better a loom weaves and the

less work a weaver has to do, the better will be the cloth produced. This is easily understood, for the less chance a weaver has of putting his hands into the silk, or tying in ends wrong, or soiling them, the less causes for defect will he give. Therefore it should be every loom fixer's supreme ambition to have the looms under him in the very best shape, which means good cloth, good production and good pay. Yet to gratify that ambition is not so easy, as some looms will be very obstinate and refuse to be improved for a long time; but as I often told loom fixers in such cases, "If they didn't know what was the matter, try until they found out," they just as often succeeded in finding the causes of some other loom's balkiness.

It is very important that a loom should be properly secured to the floor, a necessity so self evident that it would seem incredible any one should ever overlook it, as, if not so fastened, the vibrations of the loom when running will make good weaving absolutely impossible. Yet I have seen looms which were screwed down with anywhere from one to three screws, and I have also seen such that were running without being screwed to the floor at all, dancing a jig of the most approved style, and the loom fixer in charge never knowing or thinking of anything being wrong. The following story which happened under my own eyes will point out that such carelessness is not only detrimental to the weaving part thereof, but also detrimental to the safety of life and limb.

One day I was sitting in my office, when some of the most unearthly yells and shrieks I ever heard, coming from the direction of the weave shop, reached my ear. My hair immediately stood on its end. Rushing out of the office I was met by a deadly pale looking loom fixer, who led the way to the scene of the accident. There I beheld suspended from the drive shaft, almost as high as the ceiling, first a complete broad-silk loom, and second, suspended inside the loom, one of my twisters. After much investigation I found the way the accident happened, which was this: The twister, having orders to twist a warp into that particular loom, went to work by first throwing off the belt, this being a safety measure and the rule. But instead of "sticking" to the rule and throwing the belt off on the outside, he for no obvious reason, threw the belt off on the inside, where there was a hanger close to the pulley. For a while everything went all right, the twister twisted, the belt hung quietly and the shaft revolved as usual. But by and by the belt became jammed between hanger and pulley and finally got so tight, that the pulley took the belt, the belt took the loom (which was secured to the floor with one screw), and the loom took the twister, for a little aerial excursion. Though the rescue was easy, the lesson this accident taught those who witnessed it, was very wholesome.

The warp twisted in and tied up, the loom is ready for weaving. At this point loom fixers should convince themselves, that neither in the harness nor reed are any wrong drafts. They can easily do this, by weaving a few inches with a filling of a color in strong contrast to that of the warp. Then they will have to look sharp, with an emphasis on sharp, because most loom fixers proceed in the above related manner, but when it comes to the important part, they merely look, and cast a casual glance at the cloth, which is certainly not enough if mistakes therein have to be discovered. I have had three loom fixers, one after the other go over the cloth of a newly twisted warp, with the order to take out all wrong drafts they would possibly detect and to let me know when they thought everything was straight at last. After they reported to that effect, I was still able, without any special trouble to point out a dozen or so mistakes which they had overlooked. This was neither a difficult feat to accomplish nor was it a matter of superior eyesight, but it was simply due to my habit of looking sharp and to a purpose. Every loom fixer

ought to be able to do the same easily, and by taking this hint and by being always on the lookout for and remedying such mistakes, he will increase the value of his services to his employer to a considerable extent.

After the loom fixer has thus straightened out the cloth, or freed it of defects, he will take his loom order, and see that he has the right filling and right set of cards. Then he will put on a wheel for the exact number of picks wanted, clean his shuttle boxes and shuttles, see that the warp has the proper weight and the filling the right tension, move the belt shifter and let the loom weave, if it feels like doing so.

Silk looms are very freaky, as much so as human beings, and like the latter are subject to some kind of rheumatism in damp weather, when the production will often drop 25 per cent. below the normal. Yet it is not only rheumatism that the silk loom is heir to, but there are numberless other diseases and sicknesses which will put a loom out of humor and condition. If the loom thus happens to get sick or out of order, the weaver will loose no time but call the nearest doctor, which is the loom-fixer, whose diagnosis will invariably be, that the loom is all right, but that the silk is very poor. But the times when the manufacturer thought it good policy to purchase cheap and consequently poor silk are long past, and now-a-days the cases where a loom-fixer will be right in his diagnosis are very rare. So if it is not the silk's it must be the loom's fault, a close inspection of which, will soon prove the latter to be true.

It is not the scope of these lines to go into scientific details as to the numerous reasons which would make a loom weave badly, but, instead, I would like to point out a way how those reasons, when existing can be found through a systematic proceeding in search of them. For instance, here is a loom that weaves badly. Grant that all ordinary means have been tried, without success; the warp threads still break out faster than they can be tied in, a condition that comes under poor weaving.

First I will convince myself by my books that the silk in that loom is of the same lot as the one in some other loom running all right, so that there can be no doubt whatsoever as to the cause of the bad weaving. Then I will take stock of the rudimentary conditions which should exist in a loom, as for instance see if the front and back rolls are in right position, if the eyes or mails of the harnesses are at their proper height, that the reed in its furthest back stroke is still one inch distant from the front of the harness, that it is not rusty, that it is loose and has a little horizontal play, and lastly, which is very important and often overlooked, that the race way of the baton or lay, on which the silk is supposed to slide, is perfectly smooth. Finding those conditions to be what they ought to be, I will let the loom run without a shuttle for a while. If the ends still break out as before I will know positively, that the fault is to be found neither in the picking motion nor in the shuttle. Next I will disconnect the side dobby or jacquard and run the loom with shuttle on top of the entire warp, as the harness will not be working then. The result of this experiment will tell me whether or not the fault lies in the shedding motion or in the shed itself. Then I will run the loom with regulator or take-up motion disconnected or try a new shuttle if the first experiment did not come out satisfactorily. In short, I will try the loom under different conditions and every which way until I find exactly where the fault lies.

In many cases, of course, loom fixers will detect faults in a loom, without much trouble, but the foregoing is a hint at a systematic way of proceeding and is meant to be employed in those not too infrequent cases, where professional skill seems baffled.

Before concluding these few remarks, I would like to say a few

words about cleanliness. Silk takes dirt very freely and holds on to it with more tenacity than other fibres. For this reason it should be handled as little as possible when of a white or light color, and in many mills quite extraordinary measures are taken with that end in view. As every loom-fixer will make it his business to keep his working tools under lock and key, so should he make it a point to keep all oil cans out of the weaver's reach. Though it might increase his labors a little, he should tend to the oiling of the looms in his section himself, and always wipe the oil-hole dry after oiling. Looms need very little oil as a rule and any superfluity thereof only increases the danger of either soiling the silk directly through it or of the weaver having his hands greasy most of the time and soiling the silk. The cranks of the drive shaft, by their continuous, rapid and circulating motion, I have found to be a chief source for throwing out dirt and oil, and have found at the same time that the latter will run just as well without being oiled at all, when properly adjusted.

Almost equally dangerous are the oil holes on the connecting rod of the side dobby, or in fact on any part that has more than just a rotary motion around its own axis.

When weaving white or light colored silk the warp and cloth should be covered with sheeting or paper, which can be practically done without much trouble or expense.

In every weave shed there is a more or less draft, which will carry fine particles of dirt and oil and deposit them on the silk, unless the same is well protected as already suggested. The use of wax or soap or anything else on silk warps, in order to improve their weaving qualities, should never be tolerated as they will always show in the cloth in the shape of stripes or spots. Dirt and oil when on the warp, can be removed quite easily with borax soap or cocoanut butter and benzine, but when in the cloth it is almost impossible to take out spots, without leaving traces behind.

A good sized book could be written on silk weaving from a practical standpoint, an undertaking which I believe has not yet been attempted. The above hints do not pretend to cover the field, but to point out the way in the right direction.

The Silk Ribbon Industry.

Report of Bernard Loth to the Silk Association of America.

A review of the ribbon industry in the United States in these latter days of the closing century must perforce be very general in its character. Although the industry is barely twenty-five years old, it is nevertheless of such sturdy proportions, covers so wide a field and has already become so specialized that what is true of any one particular sphere of its activity may not be of general application. I will therefore limit this brief review to such matters only as affect the industry as a whole. The year 1898 is notable for what was practically a reorganization of the Silk Association of America. Whilst it is true that the association from its earliest days has done good work for the silk industry in the United States, yet it lacked the breadth of activity and power for good which must now perforce come to it. Not only are the weaving and throwing interests joined, but practically every industry whether mechanical or commercial, bearing upon the production of the woven product, is represented upon its membership rolls.

A subject that is of direct interest to every ribbon manufacturer, irrespective of the class of goods he manufactures, is the weight, size and quality of the raw silk he uses. It is true that for many years we have had a "Silk Conditioning Works;" it is equally true that the ratio of benefit actually enjoyed by the manufacturer has been a small one when compared to the possibilities, if the system were developed to its normal and the sale and purchase of raw silk based upon

figures issued from an authoritative source which would be under the supervision of those directly affected. It is true we have "conditioned weights" and "sizing tickets" issued in Milan and in Lyons, it is equally true that the facts are at times not "on all fours" with the theoretical conditions therein described. It is at such times that the manufacturer realizes that Milan and Lyons are a long way from home. The balance between productive capacity and domestic consumption has been nearly reached, the resultant keen competition has reduced the percentage of net profit to a minimum and the time has arrived when the manufacturer can no longer afford to "guess"—he must know. Small differences in the cost of the raw material, depending upon exact weight, size and quality, often determine whether the result of his labors will show a profit or a loss. It would seem that a fixed rule might well be established in the trade that these important data should be those certified to be a local Conditioning House whose management and methods could easily be arranged to be supervised by the manufacturers' own organization—The Silk Association of America. Questions as to weights, size, quality or other like matters in dispute would there find an arbiter whose decision would be prompt, just and final. The small increment of cost per pound of silk would barely affect the final cost of the finished product and in the many benefits derived, both direct and indirect, would be returned manifold. Our industry has discarded its swaddling clothes, the value of its output is now counted in tens of millions—has not the time arrived when the weights and quality as fixed, not in Milan or Lyons, but here in New York, where the goods are delivered and paid for, shall control? It certainly would seem worthy of a fair trial. It will be readily seen, however, that the system suggested cannot bear its full fruit unless the rule is a universal one.

The Silk Moth.

In France the cocoons of the silk worm selected for reproducing purposes are strung together like beads and placed in a dark room, where the temperature is kept at 68 degrees F. At the end of eighteen or twenty days the moths appear, but frequently the cocoons are kept a whole winter in a cellar at 50 degrees F., before being exposed to the higher temperature. The moths are allowed to couple for from six to eight hours, and then the females are removed and inclosed in little sacks made of gauze, called cellules, where they lay their eggs and die. Later on, the dead insects are examined under the microscope, to discover any traces of pebrine.

The Best Test for Indigo on Cotton.

The nitric acid test, commonly used by dyers, merchants and buyers of cloths, is often misleading. Indigo shows a yellow spot with a green rim if a few drops of concentrated nitric acid are put on the pattern. This test is not reliable, for the reason that some other coloring matters give a similar spot, and also because the yellow spot may be influenced by the presence of other colors, and therefore cannot be seen. The simplest and safest way of testing indigo on cotton is by burning a pattern of the cloth on a porcelain plate. In the presence of indigo, that part of the plate where the indigo burns away is covered with a blue indigo film. No other coloring matter will show a similar reaction.

—For 1898, the average number of hours constituting a day's work in the mills of North Carolina, was 11¾.

—At Antwerp in ancient times the block printers were included in corporations with the painters, under the name "Lucasgilde."

—The art of printing stuffs became in the 16th century a monopoly of the artist painters.

POWER DEPARTMENT.

ELECTRICITY—STEAM—WATER.

Electric Propeller Ventilating Fan.

A NEW TYPE.

Since the B. F. Sturtevant Co., of Boston, Mass., has entered extensively upon the manufacture of electric motors and generating sets, it has been carefully studying the problem of the manufacture of a compact, efficient and convenient type of electric ventilating fan. Exhaustive tests were made with different types of fan

wheels. The result is made clear by the accompanying engraving, showing a view of one of their electric ventilating fans, which have just been put upon the market.

The fan wheel has eight blades, rigidly attached to a spider at the centre, and held in place by a hoop at the periphery, at an angle of approximately 30 degrees. The angle is increased in such a manner that as the centre is approached, the theoretical velocity of the air remains practically constant. In other words, the delivery edge is helical, and the air is picked up on the inlet edge of the blades at low velocity. When well under the influence of the blades, it is accelerated to its maximum velocity with the least amount of slip. The result is an extremely efficient wheel.

The motor likewise has been the result of very careful study in the attempt to provide a light machine, entirely enclosed, and at the same time to avoid the excessive temperature which is incident to the operation of most enclosed motors. The result is a machine capable of continuous operation for 10 hours, with a maximum temperature rise of not exceeding 30 degrees F. A practical efficiency of over 80 per cent. is obtained even with the small sized motors, and an excess load of 75 per cent. above the rated capacity may be carried without sparking and changing of brushes. This feature, combined with the small temperature rise, allows of carrying temporary overloads with impunity.

The bearings are self-oiling and self aligning, and are fitted with phosphor-bronze sleeves, which are removable from the outer ends of the boxes.

The wheel is partially enclosed in a conoidal inlet ring, which decreases the frictional resistance to the entering air, and furnishes at the same time a rigid support for the motor, to which it is attached by the tripod hanger.

These fans are built in sizes from 18 inches to 120 inches, with motors designed for either medium or maximum speed, and to run at any ordinary direct current voltage. A speed controller is always provided, by means of which the fan can be efficiently operated at different speeds.

Ventilation by Disk Wheels.

The subject of proper ventilation in work-shops, factories, churches, theatres, public buildings, etc., though it has attracted a vast and constantly increasing interest almost ever since architecture advanced to a position of recognized art, is still sadly neglected in some quarters. Many people have a very inadequate idea of the importance of an abundant supply of pure and fresh air and its efficiency to the health and effect on those breathing it. Until recently little attention has been directed to secure a perfect freedom from foul air in the many factories and manufacturing establishments giving employment to a large per cent. of the population of our cities, the work often being such that it poisons the air to an alarming degree, telling sooner or later on the health of those who breathe it. It has been clearly demonstrated that all methods that depend in a greater or less degree upon natural devices for movement of air are more or less affected by atmospheric changes, and, in consequence, unless a certain amount of air is regularly supplied in a given time without reference to outside conditions of the weather, they cannot be relied upon. A general conclusion is that satisfactory and regular ventilation at all times can be secured only by mechanical movement of the air, by which a given quantity of it is removed and replaced in a given time regardless of atmospheric conditions.

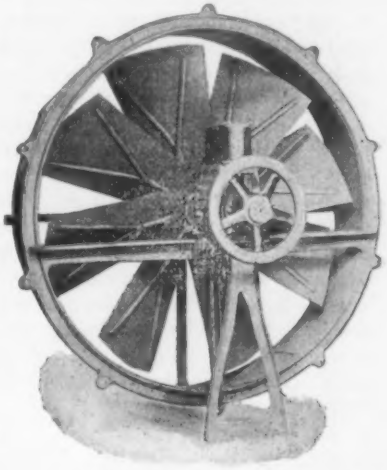
The disk wheel has proven to be one of the most efficient means of accomplishing this end, and the accompanying illustration shows such a wheel as made by the Buffalo Forge Co., Buffalo, N. Y. This wheel has been recently improved by the builders, and among their claims for it are ample capacity to handle large volumes of air at a small expense of power.

These wheels are perfectly noiseless in operation and are adapted to places where noise could not be tolerated.

The self-oiling device which permits of being left without attention for long periods of time is also commendable.

These wheels are very convenient for removing gases and smoke from forge fires, steam from boiling kettles in steam confectionaries, unpleasant odors from dye houses, and for any conditions where it is necessary to remove injurious odors by force. In paper and pulp mills the disk wheels will remove the dense volume of steam and vapor from machine rooms, preventing condensation and dripping from ceiling and roof in winter, and in summer takes away the surplus of heat which is so troublesome and injurious to workmen and goods.

These wheels will remove completely the dust from rag machines



and keep the room entirely clear of this in every way; will keep an engine room and all parts of a mill or factory free from injurious gasesand corrosive chemical fumes, and remove all offensive odors. In soap and glue factories it is found to be very useful for drying, enabling uniform results to be obtained regularly regardless of atmospheric conditions, and at all seasons of the year. For drying wool, tobacco, fruit, hides in tanneries, etc., they are of special value, when properly applied doing the work thoroughly, evenly and rapidly, and may be util-

ized to much profit. These wheels are also used to good advantage in laundries for removing steam, hot air and offensive odors.

The general sizes of these wheels range from 18 to 84 inches in diameter, although it is possible to make larger or even smaller sizes for special requirements. Something of an idea of the amount of air which may be removed by the different sizes at given velocities may be obtained by noting that a 72-inch wheel running at 300 revolutions, free delivery, moves 48,966 cubic feet of air per minute. It will be of interest to know that these wheels are becoming more and more popular for use in foreign countries.

The disk wheel shown in cut is of the engine type, wheel being heavily braced and balanced. The strength of the blade is sufficient for the hardest kind of service. The engine is of the Buffalo double single acting type, and is enclosed and runs in oil. The same high grade construction is employed on these engines as when built for electric lighting work or other refined service. These wheels are built for either belt, steam or electric power. Upon application the manufacturers will supply drawings showing disk wheel applied for the different uses herein named. Catalogues and other information can be obtained on application to the Buffalo Forge Co., Buffalo, N. Y.

—In Peel Park Museum, Salford, there is an interesting and artistic specimen of furniture printing. It bears the date of 1761, and was printed in madder red from two copper plates.

—James H. Evans, superintendent and manager of the Gem Knitting Mill, Herkimer, N. Y., has sold his interest in the mill and retired from business, owing to poor health.

—Henry Addie has resigned his position as boss dyer in the Gloucester Cotton Mills, Gloucester, N. J., and accepted a similar position with the Shetucket Co., Norwich, Conn.

Power Efficiency of Belts Increased.

The Cling-Surface Manufacturing Company, Buffalo, N. Y., have made some rather broad statements in their advertisement, from time to time, in regard to the efficiency of their product known as "Cling-Surface." A series of tests have been made with the latter, quite recently, by Prof. R. C. Carpenter, Sibley College, Cornell University, reports upon which we refer to below, showing really remarkable results obtained by this product, on a slack belt. We believe that our readers will be interested in what Prof. Carpenter has to say; and, if it is possible for managers of mills to be entirely relieved of tight belts and their accompanying troubles, and be able to transmit more power with a slack belt, they will consider the tests of much practical value to them.

Prof. Carpenter says:

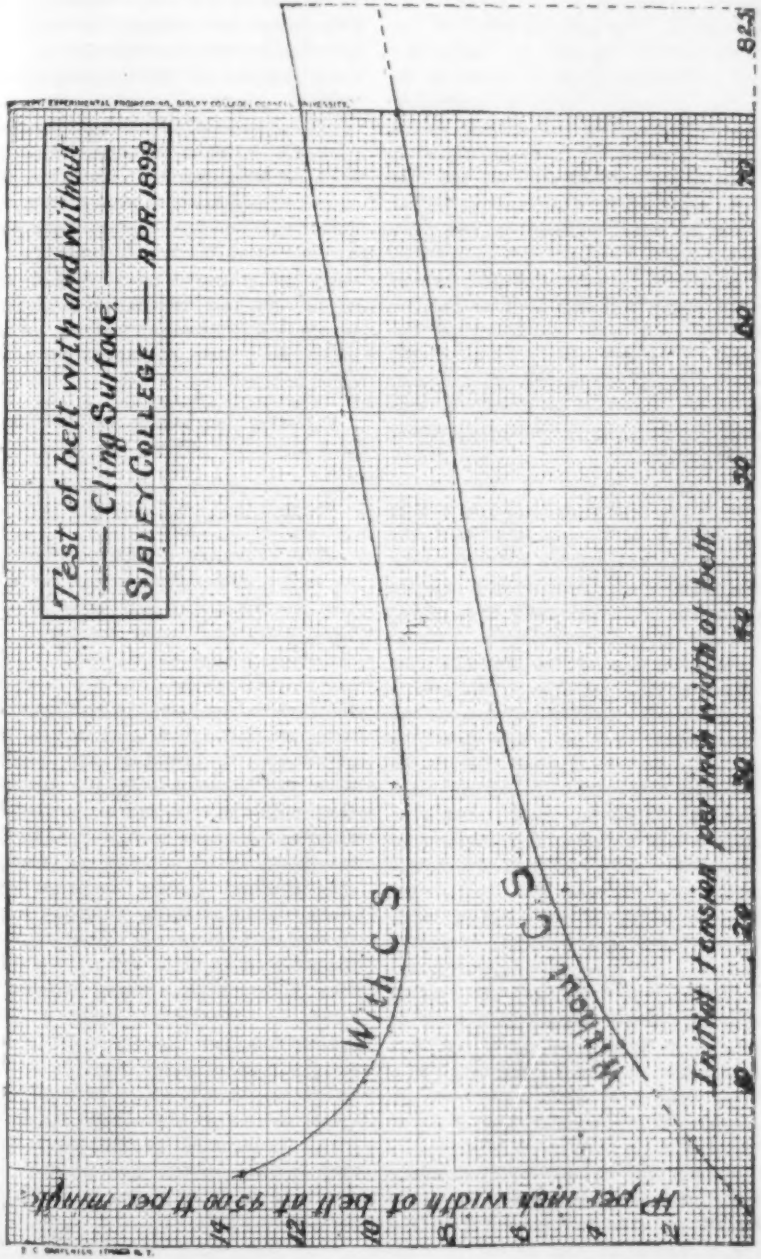
"The tests were made in every case on the belt-testing machine owned by Sibley College. Three belts were tested, each before and after treating with Cling-Surface, and each under various conditions of loading. In all over 50 tests have been made; a considerable number of observations have been repeated in order to check the accuracy of the results.

"The Cling-Surface was applied on several successive days and in small quantities in accordance with the directions supplied by the manufacturers before commencing the test. The material was almost wholly absorbed at the time of starting the test, and none has since been applied. The material made the belt soft and pliable, and gave it an inner surface somewhat resembling patent leather. This surface was only in the least degree sticky to the touch.

"The general results of the test with Cling-Surface showed an increased transmitting power as compared with the same belt in an untreated condition; it also showed an increased arc of contact, and very much less slip. It showed a very high transmitting power when the belt is run ex-

tremely loose or with very little tension on the pulleys, the reverse of which is true with the untreated belt. The greatest transmission capacity for the belt treated with Cling-Surface was found when there was the least possible tension on the belt and when the belt was running so slack that the sides very nearly touched.

"The treated belt transmitted


Test of belt with and without
Cling Surface.
SIBLEY COLLEGE — APR. 1899
With C S
Without C S
Initial Tension per inch width of belt.
H.P. per inch width of belt at 9500 ft per min.
825

much more power with a very light tension than the untreated belt with a heavy tension. The test with the belts treated and untreated, running on wooden pulleys, showed essentially the same characteristics. The general effect of the Cling-Surface appears to enable the belt to transmit a power equal to its entire capacity, without producing heavy stresses on the driving boxes of the pulleys, or in other words, it enables the full capacity of the belt to be obtained for transmitting power when the belt is so loose that the sides nearly touch.

"Tests of the untreated and treated belts, when running on iron pulleys, are shown in the accompanying diagram in which the horizontal distances show the tension on the belt in pounds per inch of width, the vertical distances show the horse power transmitted per inch of width of belt for a speed of 4500 ft. per minute. The lower line represents the results obtained with the untreated belt; the upper line the results obtained with the treated belt. It will be noted that the lower line continually rises, showing an increase in capacity with an increase in tension; the upper line descends at first, showing a decrease in capacity with increase in tension, and later rises. In no place does the transmitting capacity of the treated belt fall below that of the untreated belt. In comparing the respective results it will be noted that the treated belt has a carrying capacity of 13.8 horse power, when the tension per inch of width is five pounds, while for the same conditions the untreated belt has no carrying capacity; furthermore, it is noted that the carrying capacity of the treated belt, even at this low tension, is nearly 40 per cent. higher than that of the untreated belt, even when the tension has been increased to 80 pounds per inch of width belt.

"The falling off in carrying capacity with increase of belt tension for the treated belt, is doubtless due to the rapid change in the arc of contact, which diminishes with increase of tension. This causes a diminution in the transmitting power which is greater than that produced by the increase of pressure due to the increased tension on the belt. With the untreated belt such change is very slight, and consequently a falling off in carrying capacity for light tension takes place.

"The general effect of the Cling-Surface is to soften the belt and to put it apparently in the best condition for transmitting power and retaining its good qualities. The surface produced by the Cling-Surface remains apparently unchanged after several weeks of use, and the inference to be drawn is that the material has an effect which continues permanent for some time at least."

Fallacies Concerning the Electric Drive.

Paper read by Sidney B. Paine, Boston, Mass., at the late meeting of the New England Cotton Manufacturers' Association.

Four years ago it was my privilege to read a paper before this Association on "Electrical Driving of Textile Establishments." The discussion of that topic was more or less of a general nature, as the first mill to adopt the system had been in operation only nine months. The purpose of the paper was to introduce the electric drive to the members of the Association, with the expectation that longer and more intimate acquaintance would result in a justification of the position therein taken. In this I have not been disappointed, as there are today more than a score of textile manufacturing establishments alone, using about thirteen thousand horse power in motors. Since its introduction, however, the system has met with some criticisms on the part of those who have not tested it. This is not to be wondered at, as the writer himself did not fully grasp its possibilities four years ago, and frankly admits that he has yet much to learn of ways in which it may be applied.

It is the purpose of this paper to

discuss the criticisms above referred to, which are evidently based upon a misconception of the system and its functions.

First Fallacy: The electrical drive is advantageous only in special cases.

This was a very reasonable criticism at the start, as naturally the first mills to adopt it were led to do so by the successful manner in which it solved certain difficult problems connected with the mechanical drive. The Columbia Mills, Columbia, S. C., for instance, were located on the wrong side of the canal for a mechanical drive, the canal being between the mill and the river. No other mill site was available. At Taftville, Pelzer, Bondsville and Anderson, the water power was situated about five miles, three miles, half a mile, and ten miles, respectively from the mill. In other mills, an overloaded wheel or engine has been relieved by the transfer of the load to a source of power previously delivering less than its capacity. In one mill, which has been built less than two years, a change in the market demanded the manufacture of different goods from those originally proposed, and more power was required in certain sections than had been allowed for. In another case, a room was made available for a weave shop, to which it would have been impracticable to transmit the power mechanically. The electric drive was adopted in these early plants for special reasons, but it does not necessarily follow, as these critics claim, that the system is therefore advantageous only in special cases. In every case, so far as records have been kept, the system has proved satisfactory and unexpected benefits have been obtained.

Second Fallacy: That the efficiency of an electric drive cannot be as high as that of a well designed mechanical drive and therefore it cannot compete with the mechanical drive.

It has been claimed that the losses in the generator, wire and motors, added to the mechanical losses present in every electrical drive, amount to more than the mechanical losses incurred by the use of shafting and belting. This would be true if the mechanical losses in the two cases were the same. As, however, one of the inevitable results of a subdivided electric drive is the omission of much shafting and belting, and the reduction in the size and weight of the remainder, it is obvious that this cannot be the case. For instance, at Pelzer where 2,600 horse power in motors are in use, the widest belt in the mill measures eight inches. On an electrically driven spinning frame, when the motor is directly connected to the cylinder shaft, with the generator directly connected to the engine or water wheel, all mechanical losses (outside of the generator and motor) are saved, except those in the engine or wheel and in the spinning frame itself. In this case, between the engine shaft and the spinning frame shaft, there would be a total loss of power of about 21½ per cent. At the Lancaster Mills, Clinton, Mass., where large motors only are used, the efficiency of the plant, as a whole, between the engine shaft and the motor pulleys is 84 per cent. About the same efficiency is found at the Columbia mills. The efficiency of an electric drive can be readily determined. On the other hand, it is very difficult, if not impossible, to determine with equal accuracy the efficiency of a mechanical drive. The method usually adopted, of indicating the engine with the belts on the loose pulleys, is faulty, for power is lost due to increased slipping and creeping of the belts, when loaded. This is an actual loss and is equal to the percentage of slip. If there is a 5 per cent. loss of speed between the friction load and the full load, there is a loss of 5 per cent. of the power transmitted which has been expended in heating the belts and pulleys. Again, the ratio which the power delivered by the prime mover bears to the amount realized at the machines, is constantly chang-

ing. It is not the same today that it was yesterday. Temperature and humidity affect it as well as the condition of the bearings and the alignment of the shafting. This last item has a much larger importance than is usually attributed to it. Many an overloaded engine has been relieved by a correction of this evil. No foresight can prevent it. It is the inevitable result of the settling of the building, and of the constant vibration and strain. It requires continual watchfulness and expenditure, or it will seriously increase the losses of transmission, and also affect the output by overloading the belts, thus causing them to slip, with consequent reduction in speed on all the machines driven thereby.

Assuming for the sake of argument, however, that the actual friction loss on a given mechanical drive is 15 per cent., and on a corresponding electrically driven plant the total losses are 20 per cent. does it necessarily follow that the latter cannot compete with the former? In this case the efficiencies would be 85 per cent. and 80 per cent. respectively. The cost of fuel and water would be directly increased by the reduction in efficiency, assumed for the electrical drive. Repeated tests made by different observers under varying conditions have demonstrated that the electric drive furnishes a much more uniform and steady speed than the mechanical drive, and further that the speed may be maintained at a much higher average. This necessarily results in an increase in the production. How much must this increase amount to in the supposed case to balance the assumed lower efficiency of the electric drive? In a cotton mill the cost of coal and water averages about 2½ per cent. to 3 per cent. of the cost of the goods manufactured. The fixed charges which would not be increased by a larger production vary from 11 per cent. to 18 per cent. of the cost of the product, depending upon the character of the goods and local conditions. Under the head of "fixed charges," I have included salaries, taxes, insurance, interest, day help (not including the spinners in the ring spinning room) repairs, teaming and supplies. I have considered that the value of these items does not depend upon production so long as all the machinery is in daily operation. Assuming 3 per cent. as the cost of the coal and water, (without making any allowance for fuel used for heating and slashing), and 12½ per cent. as the ratio for fixed charges, an increase in production of 1½ per cent. would offset the assumed lower efficiency of the electric drive, even if the goods were sold at cost. To make this clear, assume that on the mechanically driven plant, the cost of the annual production was $500,000 and of the fixed charges $62,500 (12½ per cent.). The difference between these two sums, $437,500, represents that portion of the cost which would be directly increased in the same ratio as the output. If this increase amounted to 1 per cent., the cost of the increase would be 1 per cent. of $437,500, or $4375. If the goods were sold at cost, this increase would be sold at 1 per cent. of $500,000, or $5000. The net gain would be $625. The cost of the fuel and water was assumed to be 3 per cent., or $15,000. An efficiency of 80 per cent. in place of 85 per cent. would increase this item one-sixteenth, or $937.50. It is evident, therefore, that an increased output of 1½ per cent. would offset this assumed lower efficiency. The above calculation is based upon the assumption that the goods were sold at cost. If sold at ten per cent. profit, the net gain would be $1175, and it would require less than four-fifths of 1 per cent. increased output to balance the assumed lower efficiency. It is obvious that the higher the speed, the greater the production up to the point where imperfect work results. When this limitation is determined, that system which maintains the speed nearest to the maximum allowable, will show the largest production of perfect

goods. If, therefore, the electric drive in the assumed case could maintain the average speed at a point 1½ per cent. above that resulting from the use of the mechanical drive, and still be within safe limits, it would have balanced the assumed lower efficiency of 5 per cent., even if the cloth were sold at cost.

To determine this question of comparative speeds, a test was made last month on a spinning frame, which had been especially prepared for the mechanical drive by proper attention to the belting and banding. On this frame, during a two weeks' run, the front roll varied in speed from 118 to 113, records being taken twice a day. On this same frame, driven by a direct connected induction motor, during a similar run, immediately succeeding the mechanical test, the speed of the front roll varied from 122 to 121 on the first two days of the test, readings being taken hourly. On the third day the speed suddenly dropped to 119. An investigation showed that the generator belt was slipping. This was corrected as soon as possible, when the speed rose again to 121 and through the balance of the week varied from 120 to 122. Out of 71 readings 7 showed a speed on the front roll of 120; 38 showed a speed of 121; and 24 showed a speed of 122. At 11 a. m. on each of the last two days, the speed on all the machines in the room was observed to suddenly rise, showing that some change had occurred at this hour in the speed of the prime mover, which drove the room mechanically as well as supplied power to the generator. The speed on the electrical driven frame, on each of these two readings, rose to 125. The average of the 71 readings was 121.35. The results obtained from his test demonstrated the necessity of omitting as much belting and remains of the mechanical drive as possible, if the production were to be maintained at its maximum. The slip on one belt in this case was sufficient to reduce the speed, and therefore the production, more than 1¾ per cent. Some one may suggest that this might have been corrected as easily and quickly on a mechanical drive as it was on the electric drive. Such critics lose entirely the purpose of the test, and the lessons to be learned from its results, which were that the uniformity of the speed is increased and power is used more efficiently as belts are omitted. If we had had a generator directly connected to an engine or wheel, this slip would not have occurred. It is this plan that is advised on all new installations wherever practicable.

I have heard it claimed by some manufacturers that their belts do not slip. But the beautifully polished pulleys have shown that this claim could not be sustained. Belts do slip and they are allowed to slip until it can no longer be endured and then they are taken up. During the time that they have been slipping the production has been below its proper amount and power has been lost, in direct proportion to the slip. With the motor directly connected to the frame, the speed of the latter will vary only as does that of the generator. This necessarily follows by reason of the principles embodied in the construction of the induction motor. If all the frames in the room had been driven by induction motors, the speed would have been uniform on all the frames. During the mechanical test, above referred to, the speed of the front rolls in the balance of the frames in the room varied from 103 to 121, with an average of 113.5. This variation is not unusual and is no greater than has been found in other mills similarly driven. It is the inevitable penalty paid for use of the mechanical drive. While one, or, at most, a few frames can be so nursed as to show the fairly uniform speed found on the frame during the test, above referred to, it is entirely out of the question to obtain the same results on all the frames in any large mechanically driven spinning room.

The Anderson Cotton Mills of Anderson, S. C., are running 80 spinning frames, each pair of frames being driven by a motor placed between them and directly connected to each frame by a friction clutch. Between the water wheel and the frames, ten miles apart, there is not a single belt. Each frame has 208 spindles. The rings measure 1¾ inches and 1 7/16 inches in diameter on the warp and filling respectively. The speed of the front roll varies from 130 to 133 on the warp, and from 150 to 153 on the filling. The spindles have a speed of 9500 on the warp and 9000 on the filling. The average production of No. 24 filling yarn is 2.51 pounds, and of No. 22 warp yarn is 2.49 pounds per spindle per week of 66 hours.

Third Fallacy: That the reliability of the electric drive has not been demonstrated sufficiently to warrant its general adoption.

In answer to this criticism, and also to substantiate my position concerning production, I beg to quote extracts from a few letters recently received from some of the prominent users of the electric drive.

The Columbia Mills Company, as is well known, was the first cotton mill of large size in the world to place its sole dependence upon this system. This mill is now using over 1400 horse power. After five years' operation the treasurer writes:

"There is no question in our mind that there is an increase in production in a mill driven by the electric system of transmission. Just what increase there is, we are unable to make a definite statement, for the reason that we have here run by no other system, but from our experience generally we can unhesitatingly say that there is a decided increase."

The Pelzer Manufacturing Company is using nearly 2600 horse power in motors. The president and treasurer writes:

"There is beyond a doubt a great advantage in the subdivision of the drive by the use of the induction motor and the being able to run any part of the mill while the balance of the machinery stands idle. So far as the power by electrical transmission for use in cotton mills is concerned, I consider it a success beyond question."

The treasurer of the Hadley Thread Company, of Holyoke, writes:

"Our experience with the electric drive, put into our mills a few years ago, has been very satisfactory. It supplanted the rope drive which was not under cover and which gave me constant worry and constant expense for ropes and renewal of ropes. We find that we get more uniform power and that we save a great deal in transmission."

The agent of the Tremont and Suffolk Mills writes:

"The generator which was put in here about three years ago has been run continually through the day, and for the past year every working night During this time I can say it has been of great advantage to us, and, so far as results show, the repairs have been practically nothing. I see no reason today why it will not last for years. This generator is in use for power and in some instances the motors are quite a distance from the generator. For power driving, we are well pleased with it."

Fourth Fallacy: That the expense of the electric system is so great as to prohibit its general adoption.

In discussing this question we must admit there are some concerns which cannot afford to make changes only in the method of driving, although very beneficial results might follow. Their money had better first be spent in the purchase of new machinery. It is out of the question to formulate any positive statement which would apply in all cases. Each case has its own peculiar conditions. For instance, in a certain mill now considering this question, the annual production amounts to $900,000. The electric drive would cost $50,000 more than a new mechanical drive. On the other hand, labor amounting to about $1000 would be

saved. Three comparatively inefficient engines would be stopped if the electric drive were used, whereas only two could be superseded by a new mechanical drive. The increased cost of operating the electric drive would be found in increased taxes, insurance and interest. These would amount to about $3400 per year. From this must be deducted the saving in labor, $1000, and the saving in fuel. If we ignore the latter factor, the value of which cannot be accurately determined, the net increase in cost would be $2400, which would be offset if there were an increase in production of less than 1⅙ per cent., if the goods were sold at 10 per cent. profit. It is not unreasonable to expect that there would be a much larger increase than this on account of the many belts which would be omitted.

Because of its greater efficiency, of the improved quality and increased quantity of production resulting from its use, its greater flexibility arising from subdivision, and the ease with which power may be delivered at any point, the electric drive offers advantages which cannot be found in the mechanical drive.

—The manufacture of reeds is a trade that few have learned. There are some who try to see how cheap a reed can be made regardless of work produced. There is no objection to buying a good reed cheap if you can, but a poorly made reed will be dear at any price. Many reeds are being sold to-day at a price that makes it impossible that they should be anything but inferior. It is not easy for the manufacturer to determine whether the wire for the reed has been properly prepared or not. One-half the labor may be withheld from the rolling and finishing, and the buyer perhaps not know the difference, but the yarn will know the difference, and the chafing in the loom will cost more than the higher price paid for a better article. A lighter wire may also be used, which makes a narrow dent where a wide one is needed and is worth more than the difference in cost. There are no two things more important in the mill than a reed and harness, and the cost of the best is so small that the amount can hardly be figured in a piece of goods. The difference between the highest price and the lowest on these articles is next to nothing on a loom per year, but the difference in results may amount to much.

—Various causes may be ascribed for the present unsatisfactory state of affairs in the cotton industry of Japan, the chief of which seems to be the lack of preparation for the future on the part of the spinners in ordinary times. Experience shows that all spinning companies having declared as much dividend as possible in time of prosperity, without paying the least attention to the future, have now been compelled to pursue the same plan, even when they are at their worst, fearing lest they should lose the confidence of their shareholders. The consequence has been the gradual decrease of reserve funds which, when compared with the reserve funds of like companies in Europe and America, are wonderfully small. It is reported that the Government is being asked to grant the spinners a certain amount of "export encouragement money." If the spinners had made all the necessary reserve fund in ordinary times, they would not be compelled to have recourse to such expedients, even though they might have met with difficulties.

—As regards the teaching of foreign languages in Japan it may be mentioned that the Tokio Foreign Language School, which was absorbed in the Tokio Commercial School in 1885, can trace its origin to the English and French courses established in connection with the "Kaiseigakko" in 1869, which were subsequently merged in a foreign language school under the Department of Foreign Affairs in 1873.

DYEING DEPARTMENT.

Dye Recipes for June.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $3.

RECIPE NO. 81.

Orange on Cotton Yarn.

Diphenyl Orange R R on 100 pounds of cotton yarn.

Prepare bath with

20 lbs. Common Salt.
3 lbs. Diphenyl Orange R R.
(John J. Keller & Co., 104 Murray St., New York.)

Enter yarn at boil, and dye at that temperature for one hour, with sufficient turning to insure even dyeing.

Diphenyl Orange has a high coloring power and goes on the fibre evenly. (See recipe 82 for a blue from Diphenyl Blue B.)

RECIPE NO. 82.

Dark Blue on Cotton Yarn.

Diphenyl Blue B on 100 pounds of cotton yarn.

Prepare the bath as follows:

20 lbs. Common Salt.
3 lbs. Diphenyl Blue B.
(John J. Keller & Co., 104 Murray St, New York.)

Enter yarn at 170°-180°; give several turns, bring bath to boil, and dye at this temperature for one hour. Lift, wash and dry.

Diphenyl Blue B has a high coloring power. It goes on the fibre evenly, and the tone of the color resembles that of indigo.

(We have used the Diphenyl brands in a number of previous recipes. See Nos. 101, 106, 117, 137, 173 and 188, in our 1898 issues, and No. 81 in this issue.)

RECIPE NO. 83.

Brown on Cotton Yarn.

Direct Brown 9404 on 100 lbs. of cotton yarn.

Prepare the dye bath with

3 lbs. Direct Cotton Brown 9404.
(O. S. Janney & Co., 8-10 Letitia St., Philadelphia, Pa.)
20 lbs. Common Salt.

Enter yarn at 160°, turn while raising to the boil, and continue boiling for one hour. Wash and dry.

As is usually the case with direct cotton colors, the bath is not exhausted, and subsequent lots of cotton require about ⅓ less of the dyestuff. Direct Brown 9404 produces a shade fairly fast to light, washing, scouring, etc., but is made much faster by the following treatment:

After dyeing, work for ½ hour at a temperature of 180°, in a bath made up as follows:

2 lbs. Bichromate of Potash.
1 lb. Blue Stone (Copper Sulphate.)

Then wash and dry.

The dyed sample herewith was given the after treatment with Bichromate and Copper Sulphate.

RECIPE NO. 84.

Black on Cotton Yarn.

Columbia Black F B B on 100 pounds cotton yarn.

Prepare dye bath, to start, with

6 lbs. Columbia Black F B B.
(Berlin Aniline Works, 72 Front St., New York.)
20 lbs. Common Salt.

Enter yarn at boil, and turn one hour at that heat. Use less color for standing kettles.

Columbia Black F B B dyes a full shade of jet black. It is a highly concentrated color, and works perfectly level on the yarn. It will not rub off. (We have used a number of recipes with this firm's brand of Columbia dyes. See 1898 recipes Nos. 16, 70, 92 and 177).

RECIPE NO. 85.

Light Blue on Worsted Yarn.

Cyanol Extra on 100 pounds of worsted yarn.

Prepare bath with

15 lbs. Bisulphate of Soda.
1 lb. Cyanol Extra.
(Wm. J. Matheson & Co., 182 Front St., New York.)

Enter yarn at 170°-180°, give several turns, bring to a boil and dye at this temperature for at least one hour.

Cyanol Extra gives a very rich shade of blue and stands soaping and exposure to light well. This color will be found exceptionally valuable in the production of compound shades.

RECIPE NO. 86.

Reddish Brown on Cotton Yarn.

Direct Brown R on 100 pounds cotton yarn.

Prepare dye bath with

3 lbs. Direct Brown R.
(Anch r Color Mfg. Co., 462 Cherry St New Y rk.)
25 lbs. Common Salt.

Enter yarn at 160°, raise to a boil while turning, and turn one hour at that heat. Use one-third less color for future lots.

Direct Brown R dyes a reddish shade of brown. It will combine with other one-dip colors, in producing different shades. It will also dye cotton and wool mixed goods.

RECIPE NO. 87.

Blue on Woolen Cloth.

The Amend Mordant Process on 100 pounds of woolen cloth.

(Controlled by the Amend Process Co., 205-211 Third Ave., N w York.)

Prepare the bath for mordanting with

6 lbs. Acetic Acid (30 per cent.)

Turn ½ hour at 140° F., lift yarn and add

1 lb. of Chromic Acid—previously dissolved in water.

Turn for ½ hour, allowing temperature to drop during this period. Then lift yarn, and add to the bath

6 lbs. of Bisulphite of Soda.

Bring bath up to 140°, and turn ½ hour at this temperature. Rinse or pass through a hydro-extractor and dye in a bath of

15 lbs. Alizarine Blue S B.
(Pickhardt & Kuttroff.)
½ lb. 20 per cent. Ammonia.

Enter goods at ordinary temperature and gradually raise to boiling, and continue at this temperature until dyeing is completed, which should never be in less than one hour from the beginning of the boiling.

RECIPE NO. 88.

Dark Green on Cotton Cloth.

Benzo Dark Green B on 100 lbs. of cotton cloth.

Prepare the bath with

15 lbs. Glauber's Salt.
(20 per cent. of Common Salt might be used.)
3 lbs. Benzo Dark Green B.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)

Dye for one hour at a boil, introducing the cloth when the bath has reached about 190°.

When the dye bath is used for a second dyeing only 2 lbs. of the dyestuff need be added and only 3 to 5 lbs. of glauber's salt.

This color produces a cheap and full dark green, which meets all the usual requirements as regards fastness to acids, alkalies, light, etc. It is equally suited for the dyeing of raw cotton and yarn.

RECIPE NO. 89.

Claret on Worsted Yarn.

Fast Claret and Acid Magenta on 100 pounds wool yarn.

Prepare dye bath with

2 lbs. Fast Claret.
1 lb. Acid Magenta.
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter yarn at 130°, bring to boil while turning, and turn to shade at that heat.

By combining the Fast Claret and Acid Magenta, either color can be toned in shade to suit the wants of the dyer. Both colors combine with other acid dyes and extracts.

RECIPE NO. 90.

Green on Mixed Goods.

Eboli Green G on 100 pounds cotton and wool mixed cloth.

Prepare dye bath with

4 lbs. Eboli Green G Pat.
(C. Bischoff & Co., 87 Park Place, New York.)
25 lbs. Common Salt.

Enter cloth at boil, run 1½ hours at that heat, shut off steam, and run ½ hour without steam being turned on.

Eboli Green G, like Eboli Blue (See recipes 50 and 55), colors both cotton and wool alike, going on the fibre slowly and evenly. The shade shown here is a bright, and at the same time, a full shade of color.

RECIPE NO. 91.

Dark Blue on Worsted Yarn.

Fulling Blue R R on 100 pounds wool yarn.

Mordant at boil for 1½ hours with

3 lbs. Bichromate of Potash.
2 lbs. Tartar.

Rinse off and dye in a separate bath with

2½ lbs. Fulling Blue R R.
(A. Klipstein & Co., 122 Pearl St., New York.)
2½ lbs. Acetic Acid.

Enter yarn at 160°, bring to boil while turning, and turn to shade at that heat.

Fulling Blue R R gives a fine and full bloomy shade of dark blue on a chrome mordant, working evenly and slowly on the fibre. This dye is very soluble in hot water, and is well adapted for dyeing all kinds of woolen goods.

RECIPE NO. 92.

Blue Black on Worsted Yarn.

Hematine No. 1 on 100 lbs. of worsted yarn.

The yarn may be mordanted in the usual way with bichromate of potash and tartar, or lactic acid.

The amend mordanting process (No. 22) might be used to advantage.

The dyed sample was mordanted at a boil for 1½ hours in a bath made up with

3 lbs. of Bichromate of Potash.
2 lbs. of Lactic Acid.

Then washed and dyed in a bath containing

6 lbs. of Hematine No. 1.
(Stamford Mfg. Co., 133 Front St., New York.)

Enter yarn at 160°, bring to a boil while turning, and dye at this temperature for 1½ hours with constant turning.

A small addition of fustic extract, or some standard Alizarine Yellow, would aid in the production of a dead black. This dyestuff might also be applied by the single bath method given in recipe 18, Feb. 1898.

RECIPE NO. 93.

Light Blue on Worsted Yarn.

Indigo Blue S G N on 100 pounds of worsted yarn.

Prepare dye bath with

15 lbs. Bisulphate of Soda.
3 lbs. Indigo Blue S G N.
(Wm. J. Matheson & Co., Ltd., 181 Front St., New York.)

Enter yarn at 180°. Bring dye bath to a boil and dye at that temperature for at least one hour.

Indigo Blue S G N in itself gives a rich blue, depending in depth of shade simply upon the percentage used.

It is exceedingly valuable in the production of dark compound shades.

The following combinations are suggested:

Very Dark Green:
5% Indigo Blue S G N.
1% Fast Yellow S.

Dark Seal Brown:
2% Indigo Blue S G N.
2.5% Tropaeoline O O.
1.4% Orange E N Z.

Black:
3% Indigo Blue S G N.
2% Tropaeoline (O O).
3% Brilliant Cochineal F R.

RECIPE NO. 94.

Brown on Cotton Yarn.

Direct Brown T B on 100 pounds of cotton yarn.

Prepare dye bath with

50 lbs. Common Salt.
2 lbs. Direct Brown T B.
(Victor Koechl & Co., 122 Hudson St, New York.)

Enter yarn at 170°-180°, give several turns, bring to a boil and dye at this temperature for one hour.

Direct Brown T B has a very high coloring power. It goes on the fibre very evenly, and gives a rich shade of brown. This dyestuff is also applicable to union goods of cotton and wool, in the same way.

RECIPE NO. 95.

Black on Worsted Yarn.

Martial Black B on 100 pounds worsted yarn.

Prepare dye bath with

20 lbs. Martial Black B.
(Sykes & Street, 85 Water St., New York.)
1 lb. Extract Fustic.
2½ lbs. Oxalic Acid.
2½ lbs. Muriatic Acid.

Enter yarn at boil, and turn 2½ hour at that heat. Rinse.

By adding Extract of Fustic to the Martial Black B, a full jet black can be produced, which will be of great help to the dyer, as the different shades of black can be dyed by varying these two colors. (See recipe 72, in our May issue, and 52 in our April issue).

RECIPE NO. 96.

Indigo Blue on Cotton Yarn.

Blue G on 100 pounds of cotton yarn.

Mordant as follows:

15 lbs. Extract of Sumac.

Enter cotton at 130°, turn for twenty minutes at this temperature, then sink for 12 hours. Lift the cotton and wring, and, without washing, work for 20 minutes in a cold bath containing

2 lbs Antimony Salts.

Wash thoroughly and dye as follows:

1 lb. Blue G.
(O. S. Janney & Co, 240 Letitia St., Philadelphia.)
3 lbs. Alum.

Dissolve these together in boiling water and start the dyeing at 130°; keep turning while raising to the boil, and continue the boiling for half an hour. Wash and dry.

As the bath is completely exhausted, it is not necessary to wash after dyeing.

Blue G is one of the many dyestuffs that have been put on the market for imitating indigo dyed cotton, and the shade produced is identical with that of indigo dyed material, of the same depth. The shade produced is fast to light, washing, scouring, etc.

Blue G may also be dyed on cotton that has been bottomed with a diazotisable blue, and is largely used in this way for the dyeing of raw cotton.

It is important that the dyeing should be finished at the boil, as the boiling produces a shade of greater fastness, and serves to exhaust the bath. This dye does not redden by heat.

New Dyes.

We present in this issue a number of dyes that have not heretofore appeared in our recipes, which dyers will be much interested in, we think.

Recipe No. 83 shows a brown on cotton yarn, obtained from the use of Direct Cotton Brown 9404, furnished by O. S. Janney & Company, Philadelphia. This color is a regular salt color, and one of exceeding beauty and richness, and produces a shade which has excellent fastness to light, washing and scouring, but is made much faster with a subsequent treatment of chrome, such as the recipe calls for. This brown is suitable for all classes of cotton, especially for hosiery, either by using a straight color, or being mixed with some portion of yellow, blue or black. This same house also furnishes Blue G, that appears in recipe 96, for the production of an indigo blue on cotton yarn. Blue G is a color of great fastness and imitates remarkably well the shade produced by pure indigo dyed in a vat. It is especially adapted for dyeing cotton in any of its forms, either on a bottom of sumac and antimony, or on a bottom

of direct blue, having the power of being diazotized and developed into a black. We direct attention to the comments made by our dyer.

In recipes 85 and 93 are to be found two colors that are used for dyeing wool, furnished by William J. Matheson & Co., New York. The light blue on worsted yarn, in recipe 85, is obtained from Cyanol Extra, and the light blue in recipe 93 is obtained from Direct Blue S G N. Both of these colors are used in the same way, with the addition of bisulphate of soda. We call attention to our dyer's comments.

The Farbenfabriken of Elberfeld Company, New York, in recipe No. 88, furnish their Benzo Dark Green B, for the production of a dark green on cotton cloth. This color is a new homogeneous benzidine color, and is especially adapted for the dyeing of cotton direct, producing a full dark green, which meets all the usual requirements as regards fastness to alkalies, acids and light. It is equally suitable for the dyeing of raw cotton, hanks and piece goods. One-half silk dyed with this color in a soap bath, is dyed on both sides the same shade. The color is also adapted for padding, and gives good discharges with tin crystals or zinc powder.

A dark blue on worsted yarn is to be seen in recipe No. 91, from Fulling Blue R R, furnished by A. Klipstein & Company, New York. This color resists fulling and scouring, and at the same time gives a very bright color, which is fast to light.

Error Corrected.

In our last month's issue, we gave in our dyeing recipe No. 75, the use of Diamine Brown, and credited it to Farbenfabriken of Elberfeld Company. It should have read Diamond Brown.

—The foreign countries chiefly interested in the West China trade are England, America, and Japan.

Indoin Blue Patent Sustained.

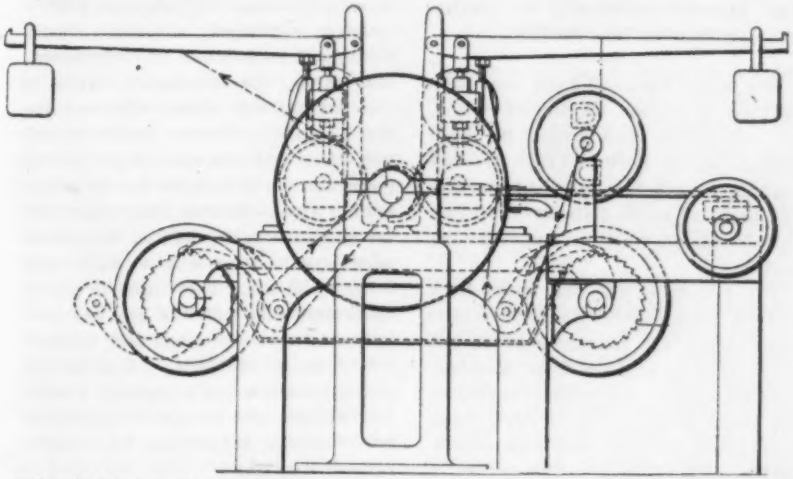
Judge Coxe of the United States Circuit Court for the Southern district of New York has handed down the decision in the interesting case of the Badische Anilin & Soda Fabrik versus Kalle & Co. in the suit brought by the former, through their United States representatives, Messrs. Wm. Pickhardt & Kuttroff, for the infringement of patent granted to Dr. Paul Julius and assigned to the Badische Anilin & Soda Fabrik for the blue coloring matter known as "Indoin Blue," which has had a very large sale and has been successfully employed as an artificial substitute for vegetable indigo. The case involved some interesting features and in some of its aspects presented a broad question of what constitutes patentability.

"Indoin Blue" is produced from sanfranine-azo-naphthol. This substance has long been known to chemists, but was considered a worthless product because of its insolubility, due to the presence of certain acids and salts. Dr. Julius discovered that by a simple process these impurities could be washed away, leaving the sanfranine-azo-naphthol comparatively pure and making it also soluble, which at once made it available as a dye product of great value. The defendants claim so simple a process as washing the insoluble product to make it soluble did not constitute patentability. The court, however, holds that the discovery of Dr. Julius possesses all the elements for patentability and that Dr. Julius has given to the world a new dyestuff of great value. "The methods by which he accomplished these results seem simple enough now, but they were open to the world of chemistry and no one ever applied them to sanfranine-azo-naphthol before. From the refuse heaps of chemistry he took a comparatively worthless body and transformed it into a substance capable of producing wealth 'beyond the dreams of avarice.' There is no doubt at all that the de-

fendants infringe. 'Bengaline' differs from 'Indoin Blue' in name only, and its sale as proved constitutes an infringement of patentee's claims. There should be a decree for the complainant." It is further ordered that the complainant shall recover from the defendants, costs and damages to the extent of profits gained, etc., in the usual way.

Machine for Dyeing.

Among the many machines that are contrived for coloring textile materials, we illustrate one that is the conception of a resident of North Carolina, for coloring goods in the piece, and at the same time starching, drying



and calendering the same in one continuous operation, and without handling. We show only that portion of the machine which directly refers to the application of coloring matter to the fabric.

In order to make the apparatus complete, ordinary drying cylinders may be used as a means for drying the textile material, after being subjected to the dyeing-size.

To carry out the purpose of the apparatus, there is provided a suitable means for receiving a web of textile material and after smoothing it out laterally subjecting it to a dye-bath containing a viscous or syrupy dyeing-size, and thereafter subjecting the fabric so impregnated with the coloring-matter to the action of pressure-rolls, which perform the dual duty of expelling the air from the interstices of the fabric and forcing the coloring-size through and upon the yarn or threads making up the fabric. This operation may be repeated, if so desired, to secure the deposition of more coloring-matter which might be advantageous under some conditions of working. The body of the dyeing-size is composed of starchy ingredients, so that it imparts a stiffening tendency to the fabric being dyed simultaneously with the completion of the dyeing process. The fabric so treated to the dyeing-size and with the excess removed is then passed to a series of drying-cylinders or other suitable drying devices, over or through which the fabric is passed and by which it is thoroughly dried.

For treating the fabric, the dyeing and stiffening-size is prepared by mixing together solutions of starch and caustic soda, and to this is added acetic acid, together with acetate of lime, acetate of iron, or calcium chlorid, together with the proper coloring basic dyes, which are soluble in an excess of acetic acid, but precipitated upon the application of heat, such as imparted by the drying-cylinders. This action is due to the evaporation of the

acetic acid, permitting the dyes to be precipitated upon the fibre through the action of the lime, etc.

It is evident that the dye-size being composed of a syrupy consistency and employing in its composition a stiffening element, such as the starch and caustic soda, there is secured the double function of simultaneously coloring and stiffening the fabric at one and the same operation, and, furthermore, there is employed the stiffening material as the basis for securing the proper consistency to the dye, whereby it may be made to cling to and be carried up by the fabric, so as to secure the proper action between the pressure-rolls.

The Aktien-Gesellschaft fur Anilin-Fabrikation, Berlin.

We lately received from the press of Pass & Garleb, Berlin, Germany, an instructive monograph, by Paul Hirschfeld, on Berlin's great dyestuff manufacturing firm, the Aktien-Gesellschaft fur Anilin-Fabrikation. From this document, we glean the following facts.

The history of the firm dates back to 1872, when several smaller concerns came under the management of Dr. C. A. Martius and Dr. Paul Mendelssohn-Bartholdy, the brilliant career of the latter being cut off in early manhood. Both partners had won considerable distinction by discovering a number of valuable aniline dyes, and inventing improved methods of manufacture.

The present directors are Dr. C. A. Martius, Dr. Franz Oppenheim and Dr. Pfaff. The capital stock is 5,000,000 marks ($1,190,000), with a preferred lien of 2,500,000 marks ($595,000). The firm possesses three extensive establishments in Germany, the main one being at Treptow, Berlin, another at Rummelsburg, Berlin, and a third one at Greppin, near Bitterfeld. There are moreover, two prosperous branches, one in Moscow, Russia, the other in St. Fous, Lyons, France.

The Rummelsburg establishment as well as the Treptow works, covers each an area of 4 hectares (about ten acres); and that of Greppin, near Bitterfeld, 11 hectares, or nearly 27 acres. The headquarters are in Treptow, Berlin. Altogether 1500 operatives are employed, besides a numerous staff of fifty expert chemists and ninety other officials.

The high regard which the firm has for its operatives is shown in many ways. The structures are substantial, and every department well-lighted, ventilated and spacious. Free bathing halls, with ordinary and Turkish baths, are always at the disposal of the workers, as well as toilet rooms, equipped with every modern convenience. Excellent restaurants and a strictly regulated canteen supply meals and pure drinks at very reasonable rates. An emergency station is also maintained, where sick and disabled employees receive careful attention. The firm has more than met the requirements of German law by establishing a considerable fund, the interest of which is devoted to furnishing pecuniary assistance in sickness and other accidents. This fund, to which operatives and officials are not permitted to contribute, has now reached 238,380 marks ($56,760). There is also under consideration a pension system for officials, and already a capital of 300,000 marks ($71,428) has been placed at their disposal.

The Rummelsburg establishment consists of a large number of well-constructed buildings, behind which flows a broad arm of the Spree river. An extensive dock accommodates the great number of ships bringing from Hamburg sulphuric acid, saltpetre and other raw materials, and taking in exchange the finished products of dye manufacture. An ingenious system of pipes worked by compressed air distributes the sulphuric acid into reservoirs, whence it is conveyed wherever it is wanted. The Chilisaltpetre obtained from sulphuric acid and saltpetre is stored in a massive magazine

capable of holding one million kilograms (2,204,600 pounds).

The distillation of coal tar forms an important and complicated branch of manufacture. The crude benzol received from Silesia, Westphalia and England passes through peculiarly shaped cylinders and thence into a rectifying apparatus, after which, being nitrized by various reagents, and then, by means of a stream of water, rid of surplus nitrogen, it undergoes still further processes, and finally yields two products, oil of Mirban (Mirbanol), a valuable constituent of soap manufacture, and muriatic aniline, which plays an important role in the production of brilliant dye compositions.

Whilst this kind of work is done in the Rummbelsburg works, the colors themselves are produced at the Treptow and Greppin establishments.

Among the many dyes and dyestuffs manufactured by the Aktien-Gesellschaft fur Anilin-Fabrikation are the following: Rubinic acid, the Rubins, the celebrated Pouceaux and Scarlet dyes, the Bordeauv, Azo-Cardinal and Fast Reds. Of blue dyes, we mention: Rosaniline blues and the various kinds of Methyl blue; of the violet hues, the following may be selected: Methyl violet, and violet and Guinea violet. Among the yellow and orange dyes are: the brilliant Curcumeine, Azo-Acid yellow, the Chrom-Fast yellow and the Patented Acid yellow. Of green tints, the best are the Guinea greens, and of blacks and Wool Black kinds, and of colors for fur-dyeing the Ursol. Of the important group of cotton dyestuffs, the firm recommends: Congo, Benzo-Purpurin. Congo-Orange, Congo-Corinth Congo-Brown, Fast blue, Congo-Rubin, Nyanza-Black, Neutral-Gray, Chicago and Columbia Blues, Sambesi-Blue, gray, brown and black. The Aktien-Gesellschaft has exclusive patents for most of their dyes.

The Aktien-Gesellschaft fur Anilin-Fabrikation may justly be proud of its achievements. It presents an admirable picture of modern industrial progress, and embraces in its operations the whole civilized world. Its exports are steadily increasing, and the value of its products are becoming more and more recognized. The company has received from exhibitions more than twenty gold and silver medals, as well as a number of honorary diplomas. In 1896, it was awarded by the Berlin Industrial Exhibition gold medals for industrial excellence. The name of the firm is known and valued wherever textile industry has obtained a foothold.

The Berlin Aniline Works, 72 Front St., New York, with branches in Boston and Philadelphia, represent the company in America, and carries full lines of its colors.

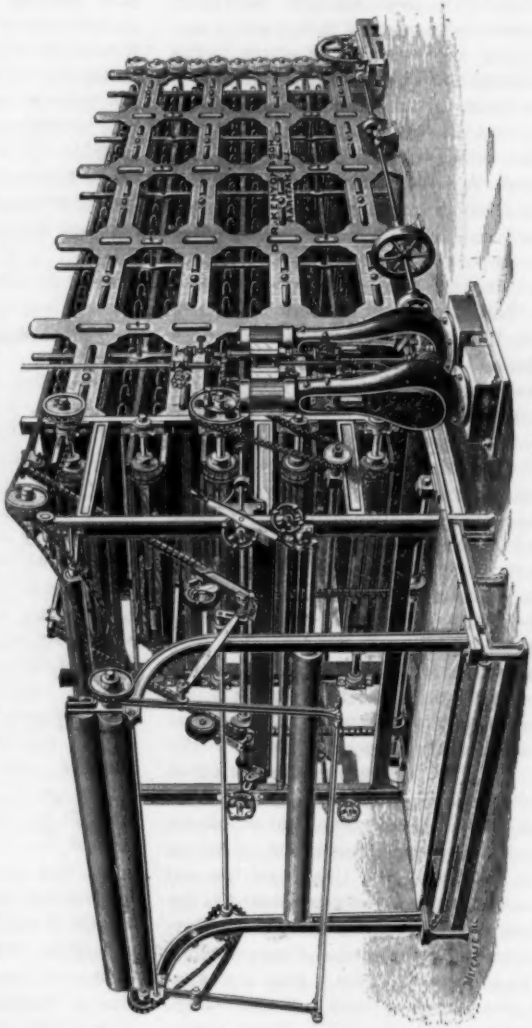
United States Trade in Japan.

The British consul at Osaka and Hiogo, Japan, writes to his government in relation to the competition that English products are meeting with those from other nations. The particular part of his report of interest to this country is the advances that are made in the trade of the United States with Japan. In regard to the supply of spinning and weaving machines, practically all of these are from the shops of Great Britain. In electrical, mining, sewing and other machine tools, it appears that the United States has 28 per cent. of the trade. In watches and fittings, the United States has 13 per cent., and Switzerland, 78 per cent.; in clocks and parts thereof, the United States has 38 per cent., and Germany 51 per cent.; in implements for farmers and mechanics, the United States has 25 per cent., and Great Britain 75 per cent.; while in locomotives and parts thereof, the United States stands well ahead with 57 per cent., and Great Britain 43 per cent. The development that has recently been made in the supply of rails for railway purposes, in Japan, from the United States, is interesting. The first exports of this kind made from this country to Japan were in 1896, when the United States supplied about one-seventh of the demand,

while in 1897 this increased to over one-third of the demand. In 1896 the United States furnished about 5 per cent. of the railway material used in Japan, while in 1897 the supply advanced to 16¼ per cent. American competition is quite recent and has been pushing the other nations out during the past year.

Tentering and Drying Machine.

We illustrate, herewith, an improved tentering and drying machine, recently patented, and manufactured by D. R. Kenyon & Son, Raritan, N. J. The accompanying illustration represents one of the largest machines on the pipe system made by this company. This style of machine is made of various lengths and widths, and from six to ten feet in height, geared direct, with double vertical engines or arranged to be driven on either side from shafting, cone pulleys being used to give the various speeds required. This concern's low-down feed is regarded as one of the most important improvements ever made on this class of machines, the operators being near the floor and out of the heat of the room. This machine requires no great height of room, as might be the case if fed from an elevated platform at the upper part. With many other valuable improvements lately added by this concern, a machine is produced of great strength and durability, that will tenter the heaviest goods.



TENTERING AND DRYING MACHINE.

—Woolen goods are in China a luxury of the rich, and are sure to show a decreased import in a bad year. The people are willing but unable, on account of prices, to take up a largely increased quantity of woolens. It is generally recognized that woolen clothing is far more suitable for the mild winters of West China than the heavy and dirty wadded garments now in vogue.

QUESTIONS AND ANSWERS

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

Mercerizing Cotton Cloth.

Editor Textile World:

Can you give me the names of two or three concerns that mercerize cotton cloth?

We have given the names of parties by mail.

Working Qualities of Cotton.

Editor Textile World:

I send you by this mail, samples of cotton, one from our finisher lapper, and one from the finisher card. I want your opinion as to its strength and general working qualities.

Rhode Island. B. M.

We can see nothing about this cotton, why it should not work well. The staple is a little weak, and perhaps has been too long in the breaker card for such stock. We would suggest putting it through the first carding a little quicker, though it might not come out quite as clean. We think it would make a little stronger yarn. All this year's cotton that we have seen is not of such strength of staple as in former years.

Knit Fabric.

Editor Textile World:

We enclose sample of webbing. Kindly advise us where we can obtain same in quantities. We have your Textile World, but cannot find the above information.

Buffalo, N. Y. J. A. Dehr.

The sample which you enclose is a two and two tuck rib, which is made on an eight feed automatic circular ribber set for making the tuck stitch. Any manufacturer with such machines, of suitable gauge, can supply you.

Color of the Cotton Bloom.

Editor Textile World:

Will you please tell me if there are any, and, if so, what changes occur in the color of the petals of the cotton bloom, from the time it first appears till it drops off.

Massachusetts. A. L. W.

For the upland variety of cotton, the petals of the bloom, when first open, are white or cream-color, which remains unchanged during the first day, but the second day the petals assume a light red, or pink color, and the third day a deep red color, by which time they usually fall off. The bloom closes partially during the evening of the first day; and some of the petals drop off during the night of the second day.

Bleach for Knit Underwear.

Editor Textile World:

Will you kindly give us the best formula for bleaching knit underwear in the web. In giving formula, state the best known ingredients in the mix, names of firms, etc. We are about to start a first class bleachery, and desire all the information pertaining thereto we can obtain.

W. G.

We have replied by mail.

Machinery for Cotton Pickeries.

Editor Textile World:

Can you give me the names of manufacturers of machinery used in cotton pickeries, for cleaning dusty cotton, and for opening, cleaning, etc., cotton samples?

C. M. C.

We have replied by mail.

Book on Dyeing.

Editor Textile World:

Can you tell me of a book that will be helpful to a man learning the dyeing business, with special reference to cotton hosiery and yarn? I also want to obtain recipes for dyeing, and other current literature on this subject.

W. R.

The best book that our correspondent can possibly obtain, that will cover his wants theoretically and practically, is the "Manual of Dyeing," by Knecht, Rawson & Lowenthal; price $15. With this publication, we would recommend a subscription to the Textile World's Dyers' Supplement, which will give recipes and samples of cotton, in colors such as are in current vogue. We would also suggest following the notices of new color cards, etc., in our columns devoted to new publications.

Electric Lights.

Editor Textile World:

I have a 3 K. W. General Electric Edison dynamo running about 40 lamps. Have recently changed from 122 volt lamps to 110 volt lamps. Have I gained anything by so doing? The pulley on my dynamo runs near the main belt of the engine. Sparks pass from one to the other constantly while the dynamo is running. Will this effect the working of the machine?

Shelburne Falls, Mass. G. G. W.

Instead of gaining in the change from 122 volts to 110 you have lost. The 122 volts would carry the required current over the same wires with less loss than 110 volts will transmit the greater current required for 110 volt lamps.

As far as the lamps themselves go there will be no difference in output, but if the lamps are maintained at 110 volts the dynamo will be called upon to do more work than if 122 volt lamps were used.

Lamb's Concealed Stitch Welter.

Editor Textile World:

I want to ask you about the Lamb Concealed Stitch Welter. Does it have a flat or round table? Can it be changed from a welter and trimmer to a sewing machine and trimmer by simply changing the foot?

W. T.

The Lamb machine has a flat table, and can be changed from a welter and trimmer to a sewing machine and trimmer, by simply changing the foot.

Fining Weavers.

Editor Textile World:

Will you please inform me concerning the legal status of the law of Massachusetts, regarding the fining of weavers for imperfect work. I think a case under this law was recently decided by the supreme court of Massachusetts.

W. F. S.

The law on the statute books of Massachusetts, relating to the fining of weavers for imperfect work, reads as follows:

"The system of grading their work now or at any time hereafter used by manufacturers shall in no way effect or lessen the wages of a weaver, except for imperfections in his own work; and in no case shall the wages of those engaged in weaving be affected by fines or otherwise, unless the imperfections complained of are first exhibited and pointed out to the person or persons whose wages are to be affected; and no fine or fines shall be imposed upon any person for imperfect weaving, unless the provisions of this section are first complied with and the amount of the fines are agreed upon by both parties."

The case in court was that of a weaver against the Hatheway Manufacturing Company, for certain deductions in her work for imperfections in weaving. The suit was brought in the superior court of the State, and carried to the supreme court, the decision being made in favor of the manufacturing company. The judge, in his decision, called attention to the phraseology of the law, "except for imperfections in his own work," to which the fine should be limited, and for which the weaver is responsible. The evidence showed that when the plaintiff went to work for the defendant, and prior thereto, there was posted in a conspicuous place in the room in which she was employed a notice specifying the wages to be paid for weaving described styles of cloth of first quality, and the wages for weaving the same styles of second quality, the quality to be determined by defendant's superintendent, which notice stated, with the detail required by law, the different kinds of cloth to be woven, and the different rates of compensation to be paid therefor; that it was the manufacturer's custom to pay wages as for first quality work, and, if any of it was found to be of second quality, to deduct the difference from the succeeding week's wages, of which custom the plaintiff was aware; that the plaintiff wove a cut of cloth of the second quality and which was determined to be so by the superintendent; that the difference in pay was deducted from her next week's wages, and that she brought this suit to recover the amount so deducted. The case was decided by the interpretation of the court of sections 51 and 55 of chapter 508, acts of 1894.

Watered Silk Effect.

Editor Textile World:

Will you kindly advise us how watered silk effect is produced on ribbons and other silk fabrics? Do manufacturers do this work themselves, or is it done by specialists? R. I.

The silk finishing firms in the Paterson district do this work on broad goods, but most manufacturers of ribbon do it themselves. The process may be briefly described as follows: The ribbon or piece of broad goods is run between a paper roller and a copper roller, the first one being smooth and the latter ribbed so as to correspond with the ribs in the goods. It is of the greatest importance that the ribs or picks in the fabric and roller should be of absolute evenness or the watered effect will not be good. The copper roller is hollow and heated by gas

from the inside. Steam is not good for this purpose. The rolls are pressed tightly together by screws. Before entering the rolls, the ribbon is stretched and goes over "scratchers." These scratchers have protuberances of various shapes, according to the effect which it is desired to produce, which displace the picks or ribs where they strike and when the ribbon reaches the ribbed roller, instead of fitting into the grooves and passing through freely, the ribs which have been over the scratchers and displaced, are pressed or crushed down, thus giving the watered effect. A skilled operative is in constant attendance on the machine and changes the effect by increasing or decreasing the tension on the ribbons. This is, of course, a mere abstract of the process, which requires great experience and judgment. It takes years of experience to be a successful "waterer," and such men earn from $20 to $30 per week.

Comparative Yarn Tables.

Editor Textile World:

Where can I get a set of good tables giving relative sizes, counts, grists, etc. of yarn with grains per cut, run, etc., as the case may be?

S. M.

The files of the Textile World for 1892 and 1893 contain the best set of comparative yarn tables ever published. We cannot supply them, however, and the next best list is contained in a pamphlet entitled Guild's Useful Tables, of which we have a few copies left, which will be sold at 50 cents each.

Schweitzer's Re-Agent.

Editor Textile World:

Will you kindly give me a chemical formula or re-action which represents an ammoniacal solution of oxide of copper, referred to in your May issue?

H. P.

Our correspondent can get his want satisfied by stepping into some drug store of good size and consult a dispensatory, and look for Schweitzer's re-agent, which is an ammoniacal solution of oxide of copper; or look on page 99, May, 1897, Textile World where full information will be found. It is the best formula that can be obtained.

Cotton Gins.

Editor Textile World:

Have you any literature pertaining to cotton ginning and baling?

J. W.

Everything of value relating to new and modern improvements in this direction will be found in the pages of the Textile World. We would suggest our correspondent writing to the several cotton gin makers in this country, for their circulars, etc. We think he would be much benefited by perusing the recent work on "Cotton," by C. P. Brooks. Price $3.00.

Bleaching with Peroxide of Sodium.

Editor Textile World:

Can you give us a recipe for bleaching cotton knit underwear in the web, by the use of peroxide of sodium?

J. N.

After boiling the goods in the usual way to remove dirt and grease, enter them into a bleach bath made as follows: To 100 pounds of water, add one-third pound sulphuric acid; to that, one-quarter pound peroxide of sodium, which should leave the bath very slightly alkaline. If this is not the case, add a little ammonia, until red litmus paper turns faintly blue. Enter the clean goods, and raise the temperature to 100 degrees, or higher, even to the boiling point. If the lower temperature is employed, bleaching is much slower, but the goods acquire a wooly feel. Wash thoroughly in warm water; blue, if necessary, and dry.

Winding a Commutator.

Editor Textile World:

Will you please inform me how to wind a commutator to run 6 incandescent lamps of 16 c. p. each, and how much power will it take to run it?

Lowell, Mass. G. T. E.

Space will not permit us to give in these columns a description of how to build a dynamo, which has already been given in this magazine. There are a number of publications that can be obtained at a small price which would cover the subject fully. A machine of this size would probably require about one horse power to produce six or seven 16 candle power lamps.

Book on Finishing.

Editor Textile World:

I would like to know where I can get a good book that will give me full instruction on finishing cotton goods, such as fancy dress goods and fine shirtings.

Penn. H. C.

The best book relating to the finishing of cotton goods, is one by Joseph Depierre, published by George Thomas & Company, in 1889. There are other books than this that touch upon the finishing of cotton fabrics, in chapters, but we know of none equal to the one we have mentioned, that is devoted to this subject exclusively.

Book on Loom Fixing.

Editor Textile World:

Can you inform me of a good book on loom fixing, especially one that will describe the English looms made by Hattersley & Son, Keighley?

J. B.

The best book to suit our correspondent's wishes, we should say, is the one by Alexander Browne, on "The Power Loom," published in Dundee, Scotland. Price $1.50. There is a good book on "Loom Fixing and Weaving," chiefly for cotton, by G. F. Ivey, Granite Falls, N. C., published in 1896. A. A. Baldwin, Brasher Falls, N. Y., published, in 1883, a very good book at the time it was issued, entitled "Loom Fixers' Manual."

New Publications.

Cotton Spinning, by W. S. Taggart. New York: Macmillan & Co., 66 Fifth Avenue. Price $4; complete set of three volumes, $7.50. The third volume of this excellent work has been issued, treating the subject of spinning and the preparation of yarns, in an exhaustive manner, covering such topics as: The Mechanism and Working of the Mill; The Ring Spinning Frame; Bobbin Winding Frame; Doubling; Yarn Preparing Machines; Mule Spinning; Humidity; and the Theory of Spinning. The author has presented the study of cotton spinning in an interesting and instructive manner, which should prove of value to those whose well being is dependent upon the success of that part of the cotton industry. To the young student, this work may be used as a text-book, while furnishing those of long experience with a fuller knowledge and a more perfect grasp of the principles underlying many of the processes and much of the mechanism of cotton spinning machinery.

Diamine Deep Blue B and R is the title of a color pamphlet issued by William J. Matheson & Company, New York, giving recipes for the colors shown. By writing to this concern for their pamphlets as noticed in our columns from month to month, dyers will, in time, be able to accumulate a valuable library of literature relating to their work.

Graphite for Lubricating. The Joseph Dixon Crucible Company, Jersey City, N. J., have issued a circular relating to their graphite for lubricating gas engine cylinders, valves, etc. The graphite of this concern is not affected by any degree of heat.

Protectionist, for May, 1899. This is the new title of the monthly organ of the Home Market Club, 77 Bedford Street, Boston, Mass., the successor of the "Home Market Bulletin," under a new form. The magazine is devoted to sound money, good government, and the expansion of commerce, as well as to the protection of home industries. Price $1.

Hurricane Fans. The Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, have just issued a little booklet on ventilating and drying, which will be mailed on application. It discusses the design of fans, results accomplished, etc., and gives a table of capacity, power required, etc.

The Federal Census. The American Economic Association has just published the various papers or critical essays by members of the Association, which were read at its last meeting, all relating to the scope and method of the eleventh census, with a view of determining what ought to be attempted at the forthcoming one. The object of the essays was to form an intelligent public opinion upon this important scientific undertaking. The lines of inquiry and discussion were: the methods and results of the last census, the scope and method of the next census, and the experience of other countries, references and bibliography. Price $2.00. 516 pages. Issued from the press of Macmillan & Company, 66 5th Ave., New York.

Color Cards. The Farbenfabriken of Elberfeld Company, New York, have issued attractive color cards relating to their Phenol Blue Black 3 B, Pluto Brown R, and Direct Blue Black 2 B.

Yale Review for May. New Haven, Conn.: Tuttle, Morehouse & Taylor. This is a quarterly journal for the scientific discussion of economic, political and social questions, edited by the professors connected with Yale University. This number contains several scholarly articles. Among them may be mentioned the following: A French Colonial Experiment in the Far East; Taxation of Mortgages in California; The Political Drift of Germany.

Milling Fast Colors. This is the title of Bulletin No. 72, showing dyeings of Milling Fast Colors, sold by William J. Matheson & Co., New York. Dyed samples accompany this Bulletin, which make it an attractive feature, and one that dyers would be greatly interested in, we are quite sure. We would suggest writing to this concern for it.

Covert Coating. Farbenfabriken of Elberfeld Company, New York, have issued a sample card, showing one-half wool ladies' covert coatings, of shades especially fast to light, with directions for dyeing, etc.

Marsh Boiler Feed Pumps, and Deep Well Pump Engines, are the titles given pamphlets issued by the Goulds Manufacturing Company, Seneca Falls, N. Y., handsomely illustrated, with sectional drawings and half-tone perspectives, showing the value of these machines. Those in want of engines and pumps would do well to look into the merits of these, and write for the pamphlets.

Bulletin of the Department of Labor, for March. Edited by Hon. Carroll D. Wright, Commissioner, Washington, D. C. This Bulletin is given chiefly to the discussion of pawn broking in the United States and Europe.

Diamineral Black 6 B and 3 B. William J. Matheson & Co., New York, have just issued a color card showing the effect of their Diamineral Black 6 B and 3 B, on cotton. These products are suitable for producing blue black and jet

black. They also give very even effects on mercerized yarns.

Appleton's Popular Science Monthly, for June. New York: D. Appleton & Co. Price $5 per annum. In this number, the comptroller of New York City furnishes an article on "The Abuse of Public Charity." The author's position enables him to see at close range the actual working of the present system, and in this article, he expresses himself emphatically in condemnation of it. The negro question is discussed in this number, by J. L. M. Curry, late minister to Spain, and now director of both the Peabody and the Slater educational funds. Mr. Curry has had exceptional opportunities for studying the negro in the South. A graphic picture of the curious aspects of life which may be seen in mining camps in Alaska, is given in an article entitled "Dawson," a city of some prominence. "The Age of Niagara Falls" is the topic of an article of a geological character, with recent investigations confirming a comparatively recent origin of these falls.

Statesmen's Year Book, for 1899. New York: Macmillan & Co. Price $3. This is an annual publication, giving statistical and historical matter relating to the states of the world. The annual under notice is an American edition, which is entirely new, making its first appearance this year. The American edition is edited by Carroll D. Wright, United States Commissioner of Labor. Heretofore, the annual has contained no more matter than about forty pages relating to the United States, while in the present annual the United States has given to it 282 pages. The aim of the part devoted to the United States is to present information most desired by legislators, publicists, authors, professional and business men. This year's book is a vast improvement over many of its predecessors.

History and Manufacture of Floor Coverings. Published by the Review Publishing Company, New York. Price $1.50. 98 pages. The purpose of this book is to present concisely, yet comprehensively, such information regarding the history and technique of the trade in floor coverings as is desirable and necessary for those who are engaged in the making or selling of these goods. An idea of the character of the book may be judged from the following, which appear as titles to chapters: Carpeting in Antiquity; Carpet Industry in the United States; Oriental Rugs and Carpets; Axminsters; Wiltons; Tapestries; Velvets; Moquettes; Smyrna Rugs; Venetian and Dutch Carpets; Straw Matting; Oil Cloth; and A Carpet Cyclopaedia.

Immedial Black. William J. Matheson & Company, New York, have issued two color cards, showing dyeings of their Immedial Black on cotton yarn and piece goods. These cards are well worth writing for, as furnishing much valuable information that dyers like to get hold of, in the way of illustrations showing certain manipulations to go through with in the dye house. We are informed that this dye in practice has given excellent satisfaction, as regards simplicity of the method of dyeing and the certainty of good results.

Canadian Textile Directory. The fourth edition of the Canadian Textile Directory has been received and shows a marked improvement over previous editions, the system of arrangement being much more convenient. The statistics bear every evidence of careful compilation and exhaustive research. The book contains about 500 pages and is handsomely bound. It not only embraces the manufacturers of cotton, woolen, knit goods, etc., but also includes collateral branches, including furniture, upholstery supplies, hat manufacturers, paper and pulp mills, retail dry goods establishments, etc., together with many statistics of the facts concerning the textile industries of Canada. The table of contents is such a long list that we have not the space to publish it, but it suffices to say that the Directory covers practically everything in the line of textile products from the manufacturer to the retail dealer. Published and received from Biggar, Samuel & Co., 62 Church St., Toronto, and Fraser Bldg., Montreal. Price $3 per copy.

Industrial News.

—San Antonio, Texas, desires and will take stock in a Cotton Factory, Woolen Mill, Leather Products or Cannery. Experienced and responsible parties (and no others) can get full information by writing the Business Men's Club of that city.

Cotton Waste Dealers.

Editor Textile World:

Our Mr. Ramlot being a subscriber to your paper, we take the liberty of asking you to give us the addresses of cotton waste dealers in the United States, as we wish to buy direct from them.

Robert Ramlot & Co.

Termonde, Belgium, May 8, 1899.

There is no directory that gives a separate list of all the cotton waste dealers. The Buyers' Index of the Textile World's Directory gives the most complete list with which we are familiar. Although the classification under the head of "Cotton and Wool Dealers" indicates the waste dealers, it does not make a separate list of them. We would refer you also to the advertising columns of the Textile World.

Mechanically Induced Draft.

In these columns reference was recently made to a mechanically induced draft outfit built for the Compania Metalurgica Mexicana. The two fans included in this plant, and which were recently shipped to the above company at San Luis Potosi, Mexico, were as large as ever have been built for this work, and said to be the largest, if not the first, ever used in Mexico. The power plant of S. D. Warren & Company, the well known manufacturers of coated or enamelled paper, Cumberland Mills, Maine, included fans of the same size, which were also built by the Buffalo Forge Company, Buffalo, N. Y. The installation included economizers. The last order of importance for a similar plant received by the Buffalo Forge Company calls for two fans of very nearly the above proportions, but having direct-attached, double-upright, double-acting enclosed engines of the U.

S. navy type. This outfit is to be shipped to Johannesberg, South Africa. Mechanically induced draft is being introduced into all sections of the world, and its adaptability for all grades of coal of different countries is being demonstrated with each succeeding installation.

—T. Brophy's Sons, whose buildings in Philadelphia were recently damaged by fire, in rebuilding, have increased their drying facilities and have installed two large "Hurricane" yarn dryers, of the truck system, manufactured by the Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.

Appreciates Our Work.

Lafayette, Ga., May 9, 1899.

A. H. Tyler, Philadelphia Office, Textile World.

Dear Sir:—On May 1st I wrote the Textile World at Boston in regard to some metallic packing, asking them if they could tell me who were the manufacturers of the packing I wanted, and on the 8th inst., just seven days from the time I wrote the letter, the packing was on the engine. I wish to thank you and, through you, your firm in Boston for your kind and prompt attention to my letter. It proves to me that you are ready and willing to serve the cotton mill interests to the best of your ability, for which we all feel very grateful.

Again thanking you for your kindness, I am,

Very truly yours,
(Signed) John R. Steele, Supt.

—An interesting donation has just been made the New Bedford Textile School by a German firm, Messrs. Felten & Guilleaume of Carlswerk-on-the-Rhine, of 40,000 of their latest improved tinned wire heddles, which are effecting such economies in weaving wherever they are introduced.

Woolen and Worsted Men.

President A. E. Jones of New York, formerly of Webster, called together the sixteenth semi-annual convention of the National Association of Woolen and Worsted Overseers in the United States Hotel May 17, where fifty gentlemen, representing the industry from all parts of the country, but chiefly from New England, had assembled. This is not a labor organization, but was established solely for educational and social advantages. Technical subjects chiefly are discussed at the meetings, and the success of this plan of interchange of ideas and the sustained interest in the discussions as shown from year to year have demonstrated the value of the organization.

At the business meeting the following named were elected to active membership: John Valentine of Lowell, R. G. Henderson of Madison, Me., Mark A. Torrey of North Bennington, Vt., John Richardson of Ravenna, O., James Williams of Seneca Falls, N. Y., and William H. Batty of Philadelphia. C. F. Beckwith of Stafford Springs, Conn., and David McTaggard of Worcester were elected to honorary membership.

H. I. Norris, of the Morse Wool Treating Company, Norton, Mass., was invited to describe the method of treating wool by the Morse system, which he did in a most interesting way, exhibiting a number of samples and describing the advantages to be derived from the cleansing of wool in this way. There were a number present who were more or less familiar with wool that had been treated by the Morse method, and spoke of it in most favorable terms, as working well, and making excellent yarn for the good appearance of the fabric in its finished state.

William M. Harding of Millbury exhibited some interesting samples of carded silk, and read a paper on Bramwell and Apperly feeds.

Dinner and a general technical discussion followed the morning session.

Fall River Textile School.

A preliminary meeting looking to the establishment of a textile school was held, May 15, at which steps were taken toward securing a charter for the corporation, as called for by the law. The corporation will be known as "The Trustees of the Textile School of the City of Fall River."

As soon as seven signers to the petition for a charter are secured, a public meeting will be called in order to place the matter directly before the parties most interested.

—The B. F. Sturtevant Co., whose well known "chimneyless" factory is situated at Jamaica Plain, near Boston, is making an addition to its already large floor space for electrical work. Another story is being added to two of its shops, one 125 feet by 50 feet, and the other 100 feet square, both of which will be used for this purpose. The increase in this department has been enormous. The company is now making electric motors up to 125 H. P., and generators up to 100 K. W.

—The commencement exercises of the Pennsylvania Museum and School of Industrial Art were held at Horticultural Hall, Philadelphia, on the 8th of this month. An address on "The Creative Spirit in Work" was delivered by Hamilton W. Mabie, of New York. On the same day, the Industrial Art Society and the Warp and Weft Club had a garden party in the court of the school at Broad and Pine Streets.

The American Ginning Company.

THE PRIOR ROLLER GIN.

With the formation of the American Ginning Company in New Jersey last week, with a capitalization of $5,000,000, an amalgamation is made with the Prior Cotton Gin Company, whereby the new organization absorbs the Prior Company and with it all the rights of the patents of that company. The new organization with its large capitalization is formed for the purpose of placing the new roller gin on the market simultaneously throughout the cotton states and to put upon the market a sufficient quantity of superior ginned cotton to make the advent of the new gin an important factor in the cotton market.

When it is figured that the new process of ginning enhances the value of the cotton, the excess profit which will of neces-

sity be divided between the planter and the buyer will amount to a minimum of $1.25 per bale.

The Frisbie Friction Clutches.

These have been pronounced perfect by thousands of mechanics.

Frisbie friction clutches, cut-off couplings and pulleys are filling the most severe requirements of mine hoisting, dredging and heavy mill machinery, as well as the exacting duties of rapid reversing, quick running machines.

"They take hold when we want them to take hold, and let go when we want them to stop," is the way one master mechanic puts it after years of experience with them.

What more can be said for a friction, and how few there are of which this can be said.

For more particulars, address,
The Eastern Machinery Co.,
New Haven, Conn.

—The Tucker Stop Motion Co., which for many years has been located at Hartford, Conn., on May 1st removed to Winsted, Conn., where their stop motions will be manufactured, and all orders, correspondence, etc., should be sent to that address.

Fall River Textile School.

The list of incorporators for the new textile school has been made up and sent to the governor for his approval. It comprises the following: Congressman William S. Greene, Leontine Lincoln, Thomas O'Donnell of the spinners, Joseph G. Jackson of the slashers, James Whitehead of the weavers, James Tamsey of the carders, John McCarthy of the loom fixers, City Solicitor A. S. Phillips, Dr. J. W. Coughlin, Senator William Moram, Treasurer E. B. Jennings of the Globe Yarn, Superintendent William Evans of the Richard Borden, Superintendent Gilbert Cuttle of the Border City, Superintendent Arthur Hamilton of the Parker, Representative William Hopewell, Hon. John S. Brayton, H. A. Dubuque, Treasurer S. B. Chase of the King Philip, ex-Congressman Robert T. Davis, and Edward S. Adams, President of the Narragansett Mill, and a member of the school committee, Mayor Jackson and Superintendent of Schools William C. Bates are members ex-officio, and the governor will appoint two more members.

—The Saginaw Mfg. Co., of Saginaw, Mich., report a very busy season so far this year. The receipt of large and frequent orders from every part of the country denotes that the prosperity now prevailing is very general. The Gilbert Wood Split Pulley, which they manufacture, has won a reputation for strength, durability and grip to the shaft, which may account largely for a good share of their business. Their washboard department also raises a high standard of excellence.

The company issued a new wood split pulley price list, on May 1st, which they will doubtless be pleased to furnish to any user of pulleys on application. It was intimated by them, that, owing to the marked advance in the cost of material and labor, a decided advance in prices might be necessary in the near future.

—The Berlin Iron Bridge Company, East Berlin, Conn., are furnishing for the United States government, at Port Caswell, N. C., a steel roof for a new torpedo storehouse. They are also building a new engine room, the roof of which has steel trusses, with corrugated iron covering, for the Hendey Machine Company, Torrington, Conn. The corrugated iron for this building is lined with the company's patent anti-condensation lining. A new machinery room for the Duncan Company, at Mechanicville, N. Y., is being put up by them, the roof trusses of which are being arranged with trolley beams and hoists.

—The Lowell Textile School, Lowell, Mass., graduated its first class on the 26th of this month.

Big Oyster Feast.

BERLIN IRON BRIDGE COMPANY ENTERTAIN MANY GUESTS.

The sixth annual oyster roast, given by the Berlin Iron Bridge Company, East Berlin, Conn., to its employees and their families, and incidentally to a great number of other guests, was held last month, in the factories of the company. This was the most successful annual gathering in the experience of the company. Twenty-five thousand invitations were sent out, throughout New England, New York, Pennsylvania and New Jersey. It is estimated that there were present from 3000 to 5000 people. To feed this immense crowd, a carload of shell oysters had been provided, also a very large quantity of crackers, etc. The oysters were roasted in the forging shop, and a large gang of men had been detailed for that purpose. Long tables had been placed throughout the shop, accommodating at one time from 600 to 800 people, and from six to ten o'clock these tables were never vacant. Immense quantities of coffee were provided, besides cigars, soda and sandwiches. Music was furnished by an orchestra for dancing, in one of the shops that had a floor space of about 250 feet long and proportionally wide. There were present a number of members of the legislature, and other prominent political officials from different parts of the State.

This company, which employs about four hundred men, besides a large force on various contracts, is well known throughout the world, where architectural buildings and large steel bridges are erected, many orders for their work being received from different parts of Europe, South America and from all parts of this country. Business is exceedingly good with this company at present. Over $750,000 worth of contracts have been received since the first of the year.

—The Berlin Iron Bridge Company have received orders from the Rome Brass and Copper Company, Rome, N. Y., for steel buildings for a large brass plant, the roof for the buildings to be of flat pitch, covered with tar and gravel, and the sides to be arranged with a quantity of glass, supported on a steel framework. This company has also the contract for furnishing and erecting the structural

steel work, consisting of beams, girders, roof trusses and other materials for the New Britain Institute, New Britain, Conn. The contracts for the bridges on the line of the Shelton Street Railway Company have been let to the Berlin Iron Bridge Company. This company has also received contracts from the Providence Gas Company, for additional buildings. It has an order from the La Capital Tramway Company, Buenos Ayres, for a steel water tower, supporting a tank having a capacity of 7000 gallons. This is the fifth order that the Berlin Iron Bridge Company has received from this quarter.

May Sales of Mill Shares.

	Lowest.	Highest
Chace	108	110
Globe	90	90
King Philip	102	115
Pocasset	107½	107½
Stafford	108	108
Troy C. & W.	1250	1250
Amory	129¾	130¼
Great Falls	151½	151½
Lawrence	126	126
Naumkeag	65¾	66
Wamsutta	103	103
Davol	102	105
Parker	100	100
Weetamoe	60	60
Amoskeag	1752½	1780
Dwight	880	880
Laconia	735	735
Lancaster	451	451
Lyman	68¼	69½
Manchester	91½	92
Merrimack	1127½	1150
Stark	1045	1045
Tremont & Suffolk	140	140
Flint	104	104
Mechanics	70	70
Tecumseh	95	95
Atlantic	60	60
Jackson	985	985
Bates	128	128
Pacific	2200	2200
York	790	790
Merchants	80	80
Sagamore	104	104

MILL NEWS.

Cotton.

New Mills.

—Alabama, Florence. Another cotton mill will probably be built here. Cyrus W. Ashcraft, president of the Florence Cotton Oil Co., is at the head of the movement. The proposed mill will cost about $50,000; capital to be subscribed in Florence. Col. N. F. Cherry, president of the Cherry Cotton Mills, heads the list of subscribers. $10,000 was subscribed within a few hours after the subscription books were opened.

—*Alabama, Talladega. Contract for machinery of the new Highland City Cotton Mills, of which F. H. Hicks is president, has been awarded, the same to be delivered Aug. 15th. Work on the mill buildings will be started very soon. The plant is to be of 3586 spindles.

—Georgia, Cedartown. It is reported that A. W. Birkbeck, recently secretary and treasurer of the new Paragon Mills, Cedartown, and who recently sold his interest in that company, proposes to establish another mill, and is investigating sites in various towns in this vicinity.

—*Georgia, Columbus. About $85,000 of stock has been subscribed for the new Community Cotton Mill. It is desired to raise $150,000 in this city and when that is done about $75,000 additional will be subscribed by Eastern capitalists.

—*Georgia, Dallas. The Paulding County Cotton Mfg. Co. has been incorporated here with $200,000 capital. President, E. Davis, vice-president, B. T. Drake; treasurer, T. Gam. It is expected that work will be started on a new building early in June. They want to build a plant that will use 25 bales a day.

—Georgia, Greensboro. $54,000 capital stock has already been subscribed for the proposed cotton mill. E. A. Copeland is interested to the extent of $20,000, and it is expected that he will be president of the company. William R. Jackson is also largely interested. It is intended to raise $60,000 and issue $15,000 in bonds and put up a $75,000 plant.

—Georgia, Griffin. The new mill at this place in which Mangham Bros. have been interested, will be built by local capital. A company known as the Spalding Cotton Mills has been organized. Capital, $100,000. The interested parties are Douglas Boyd, Seaton Grantland, W. J. Kincaid, J. D. Boyd, J. J. Mangham and others.

—Georgia, Juliette. Work has been started on the building of the cotton mill of Dr. W. T. Glover. This will be a plant of 2500 spindles; water power.

—*Georgia, Macon. Contract has been let by Calder B. Willingham of the Willingham Cotton Mills for machinery for their new mill located at this place. The mills will be under the management of B. E. Willingham, who is the treasurer of the company, which has $100,000 capital.

—Louisiana, Hargrove. Stock is being subscribed for the proposed Hargrove Cotton Mill, of which John W. Taber is secretary.

—Louisiana, New Orleans. The Louisiana Cotton Mill Co., Ltd., is the name of a new corporation with $1,000,000 capital stock, for the manufacture of cotton ducks, with office at 141 Carondelet St., New Orleans. Louis P. Bryant is president; Leo. P. Newman, treasurer; Ernest V. Reiss, secretary, and H. E. Elder, superintendent. A new mill will be built, and it is expected that production will be started in about six months, employing at the start about 50 hands. The equipment will be 4500 spindles. Other interested parties are Morris Reiss, manufacturers' agent; Harry E. Emmonds, president of the Detroit & Mexican Mining Co., and J. A. Beonbay, president of the

Hyde & Tallow Co. A complete outfit for manufacturing cotton duck will be required. They have already secured 350 H. P. boilers and 225 H. P. Corliss engine.

—*Massachusetts, Adams. We have information from the Berkshire Cotton Manufacturing Co. regarding their enlarged new mill. This will contain 100,000 new spindles and 2400 looms; steam power. Product will be fine cottons, organdies, lawns and sateens. About 1000 hands will be employed. The capital stock will be increased to $2,500,000. Total capacity of the plant, including new mill, will be 255,000 spindles and 6100 looms, practically under one roof. Work on the new mill was started May 15th, and it is expected that production will be started in the spring of 1900.

—Massachusetts, Winchendon. N. D. White & Sons, proprietors of the Glenallan Mills, contemplate building a new mill to be 75 by 275, brick, two stories, to accommodate 500 looms.

—Mississippi, Ellisville. The Ellisville Cotton Mill Co. has been organized, capital stock $500,000. C. I. Wortham, of Memphis, Tenn., was the promoter, and S. J. Johnson, N. B. Shelby, of Ellisville, and E. H. Roberts of Baltimore, Md., are interested. It is expected that $50,000 will be subscribed by Ellisville parties, and the balance will be out of town capital. The product will be cotton cloth, rope, etc.

—*New York, Elmira. The Elmira Knitting Mill informs us that foundation has been started for their new spinning mill and that the plant will have 10,000 spindles. There will also be a dye house. No new knitting machinery will be put in.

—*New York, Lockport. We have further information concerning the new linen mill to be known as the Niagara Textile Co. Capital, $50,000. Charles A. Hoag, president; W. T. Ransom, treasurer and agent, and Thomas Hawthorne, superintendent. They have bought a mill and expect to begin production about June 1st. They will start with 50 looms, although the capacity of the building will allow an increase to 125, which they hope to make later on. The product will be linen and linen and cotton towels and toweling, cotton and Turkish towels and cotton diaper cloth. The power is steam and electric.

—North Carolina, Mount Pleasant. A new cotton mill will be built here to have 5000 spindles, although the start will probably be made with about 3000. The interested parties are Cook & Foile, and Dr. Paul Barringer, president of the W. R. Kindley Cotton Mill, who will be secretary and treasurer.

—*North Carolina, Red Springs. We understand that $25,000 capital stock has already been subscribed for the proposed new cotton mill at this place, and that $50,000 more will be in hand before early summer. A. B. Pearsoll, Mayor, is one of the promoters.

—*North Carolina, Roxboro. Ground has now been broken for the new Roxboro Cotton Factory. Contract was let to W. T. Lindsay of Lynchburg, Va.

—*North Carolina, Tarboro. The stockholders of the new Fountain Cotton Mills have decided to commence at once the erection of buildings for a 10,000 spindle plant. It is hoped that the mill will be ready to handle the cotton crop in the autumn.

—*North Carolina, Wilmington. E. C. Holt, of Burlington, S. C., has purchased land as a site for the new cotton mill, recently mentioned for this place, the company to have $250,000 capital, to build a mill with 10,000 spindles and 500 looms; product to be colored goods. The mill buildings are estimated to cost $70,000; the main building is to be 125 by 250, two stories, with separate engine and boiler room.

—Pennsylvania, Philadelphia. William O'Neill, formerly of the firm of Clarke & O'Neill, has established a plant on Oxford and Josephine Sts., Frankford, for the manufacture of cotton table damask. He is installing 60 looms, eight winding machines and necessary finishing machinery. James F. White & Co., of New York, are the selling agents.

—South Carolina, Anderson. We note that the project of establishing a cotton mill here is now progressing, and that $150,000 capital stock has been subscribed. It is expected that a company will be organized with $300,000 capital. J. J. Fretwell is interested.

—*South Carolina, Belton. Our report of last week concerning the new cotton mill here, has been confirmed. As stated then, the plant will have 15,000 to 20,000 spindles with automatic Draper looms. The management will be the same as that of the Pelzer Mfg. Co., of which Capt. E. A. Smythe is president. Francis J. Pelzer, of Charleston, S. C., is also interested. The name is the Smythe Mfg. Co.

—South Carolina, Columbia. We note that a charter has been applied for by the Olympia Cotton Mills of Columbia. Capital stock, $1,500,000. The plant is to be operated by electricity furnished by the power plant on the Columbia River. Report states that this mill will be one of the largest in the South, having 104,000 spindles and 2600 looms, and that the incorporators are Columbia cotton mill owners and leading business men.

—South Carolina, Greenville. B. A. Morgan informs us regarding the new jean mill, that such a plant is talked of, but hardly enough encouragement has been received yet to base much hope upon.

—*South Carolina, Little Rock. The Little Rock Cotton Mills Co. has been granted a charter. T. C. Sherwood, R. P. Hammer and others are interested. This is the new mill mentioned last March which will build a plant costing about $50,000, to be enlarged later.

—*South Carolina, Spartanburg. The company which has now been incorporated to establish a mill at Lolo, a few miles north of this city, will be known as the Valley Falls Mfg. Co. J. M. Splawn, recently superintendent of the Clinton Cotton Mills, will be general manager. The capital stock is $75,000.

—*Tennessee, Chattanooga. A new company, known as the Richmond Spinning Co., has been organized with $150,000 capital stock, all of which has been subscribed. Arnold B. Sanford, of Boston, is interested, with prominent Chattanooga capitalists, among whom are E. G. Richmond, Morgan Llewellyn, Linus Llewellyn, Davis Giles, Augustus Rhat, of

Chattanooga, and Garnett Andrew of Rossville, Ga. E. G. Richmand, president of the Richmond Hosiery Co. will be president of the new corporation and Arnold B. Sanford vice-president. The Board of Directors will consist of the above named parties. It is the intention to sell the product of the mill to Northern manufacturers through the American Cotton Yarn Exchange, conducted by Mr. Sanford in Boston. This will be the first mill in the South to manufacture combed cotton yarns. It is understood that orders have already been placed for some of the machinery.

—Tennessee, Dyersburg. J. N. Parker, cashier of the Citizens' Bank at Dyersburg, informs us that the proposed new cotton mill is purely in embryo. The town would like to interest Northern mill owners in the subject of building a mill here. J. N. Du Bose of the Phoenix Cotton Oil Co. of Memphis, has been mentioned in connection with this project, but he has taken no active steps in the matter.

Enlargements and Improvements.

—Alabama, Sycamore. The Sycamore Mills, owned by D. L. & J. A. Lewis, will be enlarged by a new building, 60 by 300, one story. This will about double their plant. Thomas L. Houser & Co., of Anniston, Ala., have the building contract.

—*Alabama, Tallassee Falls. The directors of the Tallassee Falls Manufacturing Co. have authorized the issuance of the company's bonds in the sum of $250,000, to pay for the enlargement which we recently mentioned would be made by them.

—Connecticut, Moosup. The Aldrich Mfg. Co. has recently added six new combers and is now running part of the carding department night and day. Other additional machinery is expected to increase the plant by about 8000 spindles, making a total of 40,000 spindles. A large stock house is being built.

—Connecticut, South Willington. Gardiner Hall, Jr., will enlarge his cotton thread mill at this place.

—*Georgia, Cedartown. The new Paragon Mills have been transferred to the Cedartown Co., and the following officers have been elected: Hon. Charles Adamson, president, and J. Wright Adamson secretary and treasurer. About 9000 spindles will be added to the present plant of 11,000 spindles of the Cedartown Cotton Manufacturing Co., and an extension will be built for this plant. The capacity of the Paragon Mills, it is said, will also be increased to 12,500 spindles.

—Georgia, Jackson. The Pepperton Cotton Mills expect to put up a new mill and add 5000 new spindles and 160 looms, which will double their capacity.

—*Georgia, LaGrange. The LaGrange Cotton Mills are now putting up the large addition which we mentioned several months ago as contemplated. This will about double their capacity. It is expected that the new building will be completed in July.

—Maryland, Ilchester. We hear that the Thistle Mills Company will erect a second mill, to result in the doubling of their present capacity.

—Massachusetts, Fall River. The Stevens Mfg. Co., whose plant has 5060 spindles, will make several additions involving an outlay of about $40,000. An addition, 41 by 54, will be made to the cloth room, 67 by 80 to the weave room, and 73 by 113 to the spinning mill.

—Massachusetts, West Warren. The contract has been let by the Thorndike Company to the Flint Building and Construction Company, for the building of a fourth story to their main building. We note a report, also, that the No. 4 Mill of the Thorndike Company may be used for the manufacture of napped cloths and blankets.

—Mississippi, Meridian. The Meridian Cotton Mills, now operating 6240 spindles and 202 looms on plain and fancy cottons, are thinking of doubling the capacity this summer. The president is L. Rothenberg; treasurer, C. W. Robinson; general manager, Louis Cohn.

—*New Jersey, Millville. The Millville Manufacturing Company will soon start work on a weave room, having torn down an old building adjoining their plant, to make room for this addition.

—North Carolina, Forest City. The Florence Cotton Mills are said to be about to enlarge their plant, giving a total capacity of 15,000 spindles, operating on yarns. The capital stock will also be increased to $300,000.

—North Carolina, Gastonia. The Trenton Cotton Mills will build an addition which will about double their present plant. They now operate 3000 spindles. Their capital stock will be increased and shares taken by old subscribers.

—North Carolina, Henderson. The Henderson Cotton Mills are to increase their plant by the addition of 8000 spindles, giving them a total of 15,000 spindles. The stockholders have authorized the expenditure of $100,000.

—North Carolina, King's Mountain. At a recent meeting of the stockholders of the King's Mountain Cotton Mill Co., it was decided to enlarge the plant during the next year. Particulars have not been given out yet.

—*North Carolina, Laurel Hill. The Ida Yarn Mill, M. L. Morgan, secretary and treasurer, has enlarged its plant by the addition of 1248 new spindles, giving them a total of 3360 spindles. Their product is now warps and yarns, 12s to 16s, 2-ply. This enlargement was put in operation April 1.

—North Carolina, Lowell. The Spencer Mountain Mills, of which J. C. Rankin is president, will put up an additional plant, costing about $250,000. Their present plant has 6000 spindles, and the new mill will have 10,000 spindles and 100 looms.

—North Carolina, Mt. Holly. It is reported that the Tuckasegee Cotton Mills, at this place, are to be enlarged by the addition of 10,000 spindles. Their present mill consists of 6000 spindles. A. P. Rhyne is president and A. C. Lineberger, treasurer and agent.

—North Carolina, Reidsville. The Edna Cotton Mills are adding 1664 new spindles, which will give them a total of 13,000 spindles and 552 looms.

—*North Carolina, Rutherfordton. The Levi Cotton Mills Co., of this place, in-

form us that they are to add 4200 new spindles. This plant is a new one, and was started only last February. Their product is twisted yarns, 24s to 40s. This addition will give them a total of 6200 spindles. Capital stock is $50,000. Myer Levi is presidednt; J. F. Flack, treasurer, and R. H. Smith, superintendent.

—North Carolina, Salisbury. The Salisbury Cotton Mills inform us that they expect to have their new machinery running by next October. An addition will be built to provide for 4000 to 5000 new spindles and about 89 new looms, which will give them a total of 20,000 spindles and 592 looms.

—North Carolina, Spray. The Nantucket Mills will install 400 new looms, giving them a total capacity of 700. This plant only went into production in July, 1898, and has been very successful. They make colored cotton goods. It is operated by water power and has a dye house.

—*North Carolina, Swepsonville. We find that work has already been started on the addition to the Virginia Cotton Mills. They will put in 5000 new spindles and 150 new looms. This company has $100,000 capital. President is A. L. Baker; treasurer, E. M. Cook.

—Pennsylvania, Philadelphia. Spencer & Chatterton have let contract for an addition to their cotton mill to George W. Roberts. This will be an enlargement of their weaving mill, 28 by 42, and engine room, 97 by 12.

—Pennsylvania, Philadelphia. E. Holden & Co., manufacturers of table damask, are building an addition. New Crompton looms will be put in.

—*Rhode Island, Westerly. Work has been started on the large new building at the plant of the William Clark Co., now controlled by the American Thread Co.

—Rhode Island, Woonsocket. Contract has been let by Col. Frank Harris to George P. Warfield for building a new brick building adjoining the Hamlett Mill, now operated by the Pycott Mfg. Co. The new building will be 92 by 124, brick. It is expected that the building will be ready for occupancy by July 1.

—*South Carolina, Blacksburg. The Cherokee Falls Mfg. Co. inform us that all machinery and supplies have been bought and most of the machinery received for their enlargement, which includes 156 new looms, giving them a total of 548 looms and 9776 spindles.

—*South Carolina, Cedrus. Nesbitt & Son, whose address is Cedrus, S. C., have bought the Fork Shoals Cotton Mills, as we reported last February. They inform us that they will now improve and further utilize the fine water power at Cedar Falls, one mile below Fork Shoals.

—*South Carolina, Greenville. We are informed by W. B. Moore, secretary and superintendent of the Mills Mfg. Co., that they will add 6720 new spindles.

—*South Carolina, Greenville. We hear from the F. W. Poe Mfg. Co. that their new equipment will consist of 144 looms and 14,336 spindles, making a total of 752 looms and 25,088 spindles. Their enlarged mills will employ about 300 hands.

—Wisconsin, La Crosse. The Star Knitting Co. will add new machinery which will increase the capacity of the plant about 25 per cent.

Mills Starting Up.

—Delaware, Wilmington. It is expected that the Arlington Mills will be put in operation soon, after an idleness of four or five years, as Judge Bradford of the United States Court at Wilmington, has confirmed the sale of the plant to Andrew D. Jones, representing Woodward, Baldwin & Co., Baltimore.

—*Kansas, Independence. The machinery for the new plant of the Kansas Cotton Mill Co. has arrived, and it is expected that the mill will be in operation July 1st.

—*Massachusetts, East Hampton. Williston Mills, which were recently bid in by the mortgagees, for $95,000, has been sold to J. H. Lane & Co. of New York, who will overhaul and operate the plant very soon.

—*Massachusetts, Newburyport. The Peabody Mfg. Co. has been incorporated under Massachusetts laws by Seth A. Borden, Leontine Lincoln, Milton Read, George Silsbury, John D. Flint and John Barlow of Fall River, Fred D. Easton and Stephen A. Jenckes of Pawtucket, and Walter L. Parker of Lowell, who are all directors of the Hargraves and Parker Mills, Fall River. A. M. Hamilton, superintendent of the Parker Mill, and Architect William T. Henry of Fall River are also interested. The company has $60,000 capital. The Peabody Mill property was recently bought by Mr. Borden for about $60,000. The mill will be started up very soon on sheetings and shirtings. It is expected that eventually the plant will be changed over to fine goods. It is probable that no new machinery will be put in until the mill has run enough to find out what can be done.

—*Massachusetts, North Adams. The Eagle Cotton Mill will resume operations within a week or two, employing about 200 hands. The Windsor Print Works with which the Eagle Mill is connected are reported as expecting to enlarge this season. The Eagle has not been run for several years.

—*New York, Cohoes. The United Waste Mfg. Co., organized last February at Troy, has now purchased the American Knitting Mill at Cohoes from Charles P. McCarthy, and will establish a branch therein. Charles Kavanaugh and James H. Shine are active in the new company.

—Pennsylvania, Chester. Mill No. 1 of the Chester Mfg. Co. will be started up within two or three months, employing over 250 hands. It is probable that new machinery will be put in to make the same line of goods made at No. 2 mill.

—*South Carolina, Chester. The parties who recently purchased the old Chester gingham mill have incorporated. A charter has been granted them and they will now operate under the name of the Springsteine Cotton Mills, with a capital stock of $100,000. The incorporators are O. P. Heath, Eli B. Springs and Brevard D. Springs.

—*Tennessee, Chattanooga. J. C. Vance informs us that the Vance Cotton

Mill Co., of which he is president, will have a capital of $60,000. A. C. Carey will be secretary. Product will be knitting yarns, 8s to 16s, and he expects to start with 3000 spindles and later put in 2000 more. It is probable that the plant will be ready for operation next July. At present he is in the market for cotton openers and lappers, spinning machinery, electric lighting apparatus, feed water heater and pump, and iron smoke stack.

—*Texas, Sherman. The Sherman Cotton Mills will be started up, as recently mentioned. The equipment is 3000 spindles, 72 looms. Product is seamless grain bags; steam power. The company has $100,000 capital. The president is W. C. Howard; secretary and treasurer, J. T. Howard; superintendent, H. W. Fairbanks; selling agents, Robinson Hughes Co., Louisville, Ky. They will do business under the name of the Sherman Cotton Mill.

Mills Shutting Down.

—Massachusetts, Ashland. The American Thread Co., which now controls the Warren Thread Co.'s mill, will be closed down after October 30th, 1899. All employees who remain in the service of the company until that time, will be paid full wages for two months thereafter and will also be given other positions as far as possible.

Woolen.

New Mills.

—*New York, Norfolk. We find that the woolen mill in which W. S. Bennett is interested, is the mill which was known as the Home Woolen Mills, Raymondville. Mr. Bennett is now removing the machinery to Norfolk, and the plant is now known as the Norfolk Woolen Mills. The product is all wool heavy cassimeres. It is a one set plant, using water power.

—*Virginia, Radford. We find that the Radford Woolen Mill Co. is the name of the new concern recently organized here. President, Joseph H. Chumbley; secretary and treasurer, John P. Osborn; manager, L. L. Fansler. The three-story brick building of Langhon Bros. will be used.

—Virginia, Radford. A second company has been organized here, known as the Newby Woolen Mfg. Co., to establish a woolen mill in the building of the Radford Mfg. Co. It is stated that machinery is now being put in. President is S. J. Fisher and treasurer and secretary, E. F. Gill.

Enlargements and Improvements.

—*Connecticut, Winsted. Work will be started within a week or two on the addition for the New England Knitting Company. The Berlin Iron Bridge Company have the contract for the iron work.

—Illinois, Rockford. The Rockford Mitten & Hosiery Co. is building an addition, 60 by 90, three stories, for increasing their equipment.

—*Maine, Hartland. The work of installing machinery in the new mill of the Linn Woolen Co. is being carried on as rapidly as possible, and it is expected to have four sets running very soon.

—Massachusetts, Clinton. A new brick store house, 150 by 70, four stories, will be built by the Bigelow Carpet Co.

—Massachusetts, Gardner. Work has been started on the foundation for a new dye house and picker room for the Whitney Woolen Co.

—Massachusetts, Haverill. Stevens & Co. are adding new looms to their woolen mills.

—*Massachusetts, Lawrence. George E. Kunhardt confirms our report of last week that he is to erect a new mill. The plans are about perfected, and the work will be pushed forward.

—*Massachusetts, Lowell. The Massachusetts Mohair Plush Co. have had work started on their new building, which will be two stories, 100x50, which will be used for sorting and storage. This will relieve the main mill, making room for additional spinning, twisting and spooling. Extra combing was started last week, and they expect to have all new machinery running by July 1st.

—*New Jersey, Passaic. The Bottany Worsted Co. has let contract for its new buildings to the Flint Building & Construction Co. of Palmer, Mass. Report now states that six new buildings will be constructed at a cost of $250,000.

—Pennsylvania, Bridgeport. Isaac W. Smith will increase his carding and spinning departments, and a new building is being built.

—Pennsylvania, Bristol. Grundy & Co., worsted manufacturers, are building an addition, 20 by 100.

—Pennsylvania, Philadelphia. The Leicester Mills Company has purchased land adjoining its present plant on Cumberland Street, Germantown, and will erect a new mill, 20 by 160 feet, three stories, and a new dyehouse, 40 by 100 feet, one story.

—Rhode Island, Lymansville. The Lymansville Mfg. Co. is to built an addition to its weave room.

—South Carolina, Union. A new building, 80 by 200 feet, two stories, is being erected for the Union Knitting Mills. Their present equipment is 40 knitters.

Mills Starting Up.

—Maine, Limerick. The woolen mill formerly operated by Holland Bros. & Co. has been sold to a syndicate of Limerick business men for about $4,000.. The plant, which has been idle for a number of years, has been leased to Massachusetts parties, who will operate same after the necessary repairs have been made.

—Maryland, Millington. George W. Todd & Co., proprietors of the Unicorn Mills, will start up their plant with 100 looms, and may put in 100 more looms.

—Massachusetts, Blackstone. The satinet mill of Joseph H. Donohue, which is a one set plant, is being repaired, and will soon be started up, employing about 50 hands.

—*Michigan, Vassar. The Vassar Woolen Mills have been purchased by Henry Balbian, superintendent of Beckman & Co.'s mill, Cleveland, O., and his brother, Fred Balbian. They are both

practical manufacturers, and machinery is now being put in order. Fred Balbian is superintending the work. Product will be cassimeres and blankets. It is expected that an addition will be erected as soon as possible, and new machinery put in to double the capacity of the plant. 50 operatives will be employed at the start. They will also operate the electric lighting plant of the city, having been given a 10 years' contract. A new incandescent dynamo will be put in at once and an arc dynamo added in the near future.

—New York, Warrensburg. Whitby & Co.'s woolen mill, a three-set plant which has been closed for several years, will be soon started up. Repairs are now being made.

—Pennsylvania, Mansfield. The Starchan Mfg. Co., which recently purchased the plant of the Paisley Woolen Co., expects to start soon manufacturing shawls, woolens and silks.

—Pennsylvania, Norristown. Hirst & Lazareth have purchased the art square looms formerly operated by Wm. E. Montague, and the mill is being put in first-class order. We note also that the Coral Mfg. Co. has been chartered by William E. Montague, John Greer and George H. B. Martin; capital, 10,000, to manufacture carpets and rugs. This is a New Jersey corporation.

—Pennsylvania, Norristown. The Norristown Carpet Mills, which have been idle for a year, have been sold to Ivins, Dietz & Magee of Philadelphia. Price named is $25,000. Extensive repairs will be made and the mill started soon.

Mill's Shutting Down.

—*California, Marysville. The stockholders of the Marysville Woolen Mill Co., whose plant was burned last March, have voted to dissolve the corporation and not to rebuild the plant.

—Massachusetts, Millbury. We note that the woolen mill of E. Hoyle & Son is to shut down soon, indefinitely, owing to dull business.

Knit.

New Mills.

—Alabama, River Falls. The Henderson Knitting Mill Co., formerly at Troy, Ala., are now building a new $60,000 plant here. At present they are running a two set spinning mill and 15 knitting machines on underwear in River Falls.

—*Georgia, Forsyth. A charter has been applied for by the Trio Manufacturing Co., $15,000 to be increased to $50,000. This concern will manufacture yarns and underwear in the building occupied by the Forsyth Manufacturing Co. They expect to begin production about September 1. They will put in 2000 new spindles and from 10 to 20 underwear machines. C. A. Ensign, R. P. Brooks and J. W. Newton are interested.

—*Massachusetts, Pittsfield. The Musgrove Knitting Co. will be the name of the new concern in which the Musgrove Bros. are interested. Capital, $12,000. Joseph Wood, president; J. H. Musgrove, treasurer and manager, and Charles H. Musgrove, superintendent. They will start up about May 15. They will make men's and women's ribbed underwear; steam power. 10 machines to start. There will be no dye house at present.

—*Massachusetts, Spencer. We understand that J. E. Fennor has now rented a portion of the first floor of the J. E. Bacon & Co. factory on Main St., and will set up there the machinery which he has had stored here for several weeks. He will manufacture cotton, woolen, merino and silk hosiery and sell direct to the trade. A small steam plant will be put in.

—New York, Sauquoit. Ladd J. Lewis and L. J. Lewis, Jr., of New Hartford, have purchased the building here formerly operated by the Sauquoit Silk Mfg. Co., now of Scranton, Pa., and will establish a knit underwear plant. Three carloads of machinery have already arrived and this is being set up. Mr. Lewis, Sr., has been connected for a number of years with the Utica Tool Co. of Washington Mills. His son will have the direct management of the business. The capacity will be about 150 dozen per day.

—New York, Utica. A new company has been organized here known as the Fort Schuyler Knitting Co., by Ezra R. Fugh and William J. McQuade. The third floor of the Reynolds building, corner of Catherine and John Sts., has been leased and machinery ordered. Product will be ladies' knit underwear. The production at first will be only about 50 dozen per day.

—New York, Warsaw. It is expected that a knitting mill will be established here, and Wallace Wilson, of Philadelphia, is mentioned as the projector.

—New York, Warsaw. There is a report that the Oneonta Knitting Mills of Oneonta, N. Y., will be removed to this place. About $30,000 has been raised by the town. This plant has 250 knitting machines and makes cut seamless hosiery.

—*North Carolina, Kernersville. The Elmira Hosiery Mills is the name of the new company established here, of which Dr. W. C. Ashworth is president and R. Bruce Beard, general manager. They manufacture all grades of hosiery.

—*North Carolina, Salisbury. We are informed by the Salisbury Hosiery Mills that the new company which is to rebuild the plant, has a capital of $5000. The president is S. H. Wiley, and treasurer and superintendent, George F. Seyffert. They will use steam power.

—*Pennsylvania, Bath. Elmer E. Kleekner informs us that he cannot give particulars of his proposed new knitting plant, as the death of his father has delayed this project. It will probably be started under the name of Charles Kleekner & Son, the product to be ladies' vests.

—*Pennsylvania, Duryea. The Duryea Knitting Mills Co., which we reported last week, will build a new building. They expect to begin production in July. They will make hosiery, installing 30 machines to start. There will be a dye house. Capital is $11,000. James McCarthy is president; James B. Gilboy, treasurer, and F. J. Regan, secretary.

—Pennsylvania, Mifflintown. The Improvement Association has let contract

for the new hosiery mill to Joseph Brindle for $1649. This enterprise will be operated by Karl & Etchell of Nicetown. It is probable that the plant will be in operation by the middle of June.

—South Carolina, Blackville. The Palmetto Knitting Mill is the name under which a new plant at this place will do business. John Meier will be manager, and J. P. Strobel is also interested. Product will be ladies' and men's cotton hosiery; 30 knitting machines, six loopers, six sewing machines, two ribbers. They will also have a dye house.

—Virginia, Danville. Application has been made for a charter by the Danville Textile & Fabric Mfg. Co., capital stock $50,000, with the privilege of increasing to $100,000. W. P. Hodnett is president; J. R. Jolking, vice-president, and H. S. Lanier, secretary and treasurer. The company has secured a building, and is now putting in machinery for making knit goods.

—West Virginia, Wheeling. Robert G. Blankenson has leased a building on Seventh St., where he will put in machinery for knitting ladies' garments.

Enlargements and Improvements.

—Connecticut, Danielson. H. E. Wilson & Co., now operating the knitting mill here, will be re-organized under the name of the Uncas Knitting Co. Local capital is largely interested. Stock is also held by Charles Angell of New York. The capital stock is $25,000, of which $15,000 has been paid in. C. P. Backus will be president; W. H. Putnam, cashier; L. E. Wilson, secretary and general superintendent, and H. E. Wilson, agent. It is expected that a new building, 150x50, will be put up.

—Georgia, Barnesville. The Hanson-Crawley Co., which has bought the Stafford-Huguley Hosiery Co., informs us that probably a new building will be built. They expect to add nine new underwear machines and thirty five hosiery knitters. At present they have 69 knitting machines. Product is hosiery and underwear, ladies' hose, men's hosiery and half hose, and ladies' and men's underwear. President, J. L. Kennedy; treasurer, J. W. Hanson; secretary, Charles Crawley; superintendent, W. H. Booth.

—Maryland, Hagerstown. The Blue Ridge Knitting Co., now operating 60 machines on hosiery, inform us that they will shortly add about 30 new machines.

—Pennsylvania, Yorkville. The knitting mill operated by Unger & Leininger, at present operating 13 knitting machines, will soon largely increase its plant.

—Virginia, Lynchburg. The Midland Hosiery Company has been incorporated here, with a capital of $50,000. This company established a mill here several months ago, and will now add about 120 machines.

Mills Starting Up.

—New York, Cohoes. The Atlantic Knitting Mills have started four sets of machinery on the schedule of 45 hours a week. The mill has been shut down since early in January.

—New York, Little Falls. The Victor Knitting Mill has leased the finishing room of the Saxony Knitting Mill, which has been idle for some months, and will start same very soon.

—*Vermont, Bennington. G. W. Clark, Hoosick Falls, N. Y., and C. E. Bruce, Elmira, N. Y., representing stock companies, have purchased the William Campbell Knitting Mill, at Bennington, Vt., and started same, employing 150 hands.

Silk.

New Mills.

—*Connecticut, Danbury. The new silk mill of J. G. Irving, mentioned last March, is now being equipped with machinery, and will be started up very soon.

—*North Carolina, Fayetteville. Work on the new silk mill for the Ashley & Bailey Co. is progressing, and it is expected that production will start this summer. The machinery is to be removed from their factory at Columbia, Pa., consisting of 15,000 spindles and 1200 looms.

—North Carolina, Roanoke Junction. Samuel F. Paterson, treasurer of the Paterson Textile Co., has had work started on his new building, 75 by 300 feet, in which a silk plant will be established. Product will be silk lining goods with cotton warp and silk filling, also all silk goods. The motive power will be electricity from the canal where Mr. Paterson's other mills are located.

—Pennsylvania, Mauch Chunk. It is now reported that the Bonnie Silk Firm of Lyons, France, represented by W. Kobbe, desires to build a large silk mill here; the Board of Trade to be expected to raise $50,000. The plant would start with 100 looms.

—*Pennsylvania, Scranton. William H. Davis, superintendent of the Sauquoit Silk Mills, Scranton, informs us that he has purchased land here but has not formed a company yet to estaolish a new silk mill. He expects, however, to do so in the near future.

—*Virginia, Norfolk. Contract for the erection of the new mill of the Norfolk Silk Co. at Lambert's Point has been awarded to Kennedy & Hamilton of Norfolk for $40,000.

Enlargements and Improvements.

—Pennsylvania, Altoona. Schwarzenbach, Huber & Co. have let contract to W. H. Hughes & Son for an addition to their silk mill here, building to cost $65,000. Annex to the main building will be 153x48 feet, and a new building 120x47 feet will be put up. Work will be started immediately.

—Pennsylvania, Fleetwood. The Pennsylvania Silk Co., now operating 104 looms, expects to build a large addition.

—Pennsylvania, Sunbury. The Susquehanna Silk Mills have let contract to the Flint Building & Construction Co. of Palmer, Mass., for an addition 134 by 450.

Mills Starting Up.

—*New Jersey, Plainfield. It is reported that the stockholders of the new Watchung Silk Co. have now adjusted their dif-

ferences, and that the plant will soon be started up with Ralph Whitney, of Paterson, N. J., as superintendent.

—Pennsylvania, Athens. The Tioga Silk Co., which was incorporated last January with $40,000 capital stock, is about to start up its mill on Pennsylvania Ave. Edwin J. Becker is president; Alphonse A. Cardinal, vice-president, and Frederick W. Becker, secretary and treasurer. Their mill is large enough for 220 looms, about 20 of which are now in place, and more will be added in the next two months. The product of the plant will be silk dress goods. A few looms are now in operation, and instruction is being given to the operatives. Mr. Holt will be superintendent.

—*New York, Elmira. The new silk ribbon mill of J. W. Stearns & Co. on Reformatory St., will be started up very soon, employing about 600 hands. This plant was formerly located in New York City.

Miscellaneous.

New Mills

—*Rhode Island, Pawtucket. The manufacturing plant of the Smith Webbing Co., now at 272 West Exchange St., Providence, will be removed to a new mill at South Woodlawn, a part of Pawtucket. This business was started last fall by Charles S. Smith. The company has recently been incorporated with $100,000 capital; president, W. A. Walton; treasurer, E. H. Parsons; manager, Charles S. Smith; superintendent, John M. Walton. Product is narrow elastic and non-elastic webbing, silk and cotton; 40 looms; sell direct. The Messrs. Walton were recently woolen manufacturers at Wood River Junction, where their mill was destroyed by fire. E. H. Parsons is interested in the Waterbury Brass Co. The new mill is 225 by 55, two stories, with a separate engine and boiler house. An independent electric plant will be put in and a blower system of heating and ventilating. About 70 hands will be employed. Work was started on the new mill about June 1st, and it is expected to be ready to occupy early in the fall.

Enlargements and Improvements.

—Connecticut, Jewett City. The Aspinook Co. has awarded contract for a large addition to Peck & McWilliams. Work will be commenced immediately.

—New Jersey, Lodi. We note that the Alexander Dye Works have let contract to the Flint Building & Construction Co., of Palmer, Mass., for three additions to their mills.

—*Rhode Island, Pawtucket. We are informed by the Hope Webbing Co. that work on their new addition was started June 1st. The buildings will be 254 by 80, 194 by 80 and 60 by 80, one and two stories. This will largely increase their product, but equipment has not yet been decided upon fully. The company now has $300,000 capital. President is Hezekiah Conant; treasurer, Charles Sisson; secretary and assistant treasurer, Willis H. White; superintendent, Oscar A. Steere.

Fires.

—Maryland, Baltimore. The cotton warehouse of the Mt. Vernon Cotton Duck Mills was destroyed by fire May 11th. Loss $50,000.

—Massachusetts, Northbridge. The storehouse of the Riverdale Woolen Company was destroyed by fire May 11th. The loss is covered by insurance.

—New Jersey, Richland. The smyrna rug works, owned by the Acme Mfg. Co., were destroyed by fire May 7th. The loss is estimated at $15,000. The plant employed 50 hands. E. L. Suydam was superintendent.

—New York, Amsterdam. The ribbed underwear mill of Harvey & Dovel was gutted by fire May 19th. Loss is estimated between $7000 and $10,000.

—New York, Valatie. The Valatie Knitting Co., W. A. Harder, proprietor, was damaged to the extent of about $1000 recently.

—Pennsylvania, Worthington. The Buffalo Woolen Mills, Peter Graff & Co., proprietors, were destroyed by fire May 2d. The loss will probably reach between $60,000 and $103,000. This was a six set plant. We are informed by the company that they have not yet decided to rebuild.

—Rhode Island, Mapleville. The mill of the Mapleville Woolen Co., which has been idle since the fire of April, 1898, was again damaged by fire on May 5th to the extent of about $30,000; fully insured.

—Rhode Island, Providence. A fire broke out in a store house in which was a quantity of wool owned by the Atlantic Mill Co. and the Blackstone Knitting Co., doing damage to the amount of $50,000.

Facts and Gossip.

—Connecticut, Danielson. The town has voted to exempt the Danielson Cotton Co.'s property from all taxation on improvements and additions above the present assessment of $60,000, the concession to last for 10 years. This is provided that the plant employ not less than 150 hands at least nine months each year.

—Connecticut, Willimantic. The Windham Cotton Manufacturing Company's mills, which have been closed for about two years, pending the settlement of the estate of Matthew Watson, were sold May 17th, at public auction. The plant, with the exception of a small lot of land, was bid in by C. H. Merriman, president of the Bank of North America, Providence, R. I., for about $70,000. The plant has 20,000 spindles and 467 looms.

—Georgia, Athens. It is reported that the Star Thread Mill will be sold by receivers W. D. Griffith and W. T. Bryan, who have been operating the property at a profit since it was placed in their hands.

—*Georgia, Kilchrist's Ferry. We are informed by Thomas Barrett, Jr., president and treasurer of the Langley Mfg. Co., Langley, S. C., that the development of the water power on the Savannah River, above Augusta, is very uncertain as yet, and no definite steps have been

taken toward the establishment of a cotton mill here.

—Indiana, Fort Wayne. The capital stock of the Wayne Knitting Mills has recently been increased from $200,000 to $250,000, the new stock having been all taken up by old stockholders.

—Maine, Fairfield. The Kennebec Worsted Mill has been sold to Samuel Williams by a combination of the share holders. Thomas Sampson, treasurer of the Vassalboro Woolen Mills, has had a lease of the mills, and as it was understood that he was going into the trust, and the mill might be shut down, this step was taken to prevent the mill stopping. Mr. Sampson's lease has not yet expired.

—Massachusetts, Collinsville. We note that Walter A. Leigh has leased a space in George C. Moore's mill, and will start up 20 looms on worsteds.

—Massachusetts, Millbury. The M. L. Bowden Felt Company has its plant now running, and it is thought that night work will be started before long. This company was recently incorporated, capital $50,000.

—Massachusetts, Oakdale. The West Boylston Manufacturing Company has received a large government order, which will necessitate running part of the mill nights, for several weeks.

—Massachusetts, Webster. James Manning will remove his equipment now in the dye works at 72 Millbury St., Worcester, to the Webster Dye Works, until recently managed by Charles F. Robinson.

—New Hampshire, Laconia. The hosiery mills of the Hodgson & Holt Mfg. Co. have been sold by order of the assignee. They are purchased by the Belknap Mills Co. for $10,000. It is expected that the plant will be put in operation soon.

—New Jersey, Jersey City. We find, upon investigation, that the Deimel Linen Mesh Co., incorporated last month with a capital of $300,000, is identical with the Deimel Linen Mesh System Co. of California, and this was merely a step taken to transfer its principal office to the East. They do not manufacture in this country, as their fabric is imported from Germany and made up into garments here.

—New Jersey, Paterson. Doherty & Wadsworth, who have operated the Arkwright Silk Mills, have dissolved partnership. Mr. Wadsworth retires, owing to ill health. A stock company has been organized to continue the business, composed of Mr. Doherty and his sons.

—New York, Delhi. Gallant Bros., whose silk mill at this place has been in operation for several months, now propose to remove the balance of their plant from Paterson, N. J., to Delhi.

—New York, Hagaman. The Pawling Knitting Mill, which has been closed since January, has now been sold to a New York company, for $32,000, subject to mortgages held by Amsterdam banks, for $35,000, and a mortgage of $6800, held by George A. Thatcher, of Amsterdam. It is understood that the plant will soon be started up.

PERSONAL RECORD.

Cotton.

—Charles A. Nichols, overseer in the dressing department of the Newmarket Mfg. Co., Newmarket, N. H., has severed his connection with the firm, and D. L. Osgood, of Amesbury, Mass., has taken his place.

—Superintendent Hadfield and Overseer W. J. Hadfield of the carding room at the Atlantic Mills, Lawrence, Mass., have resigned. Henry C. Phillips, formerly with the New York Cotton Mills, has been secured as superintendent, and Charles Gardner of Newburyport as overseer.

—A. W. Brainard, superintendent of the Slater Cotton Mill, Webster, Mass., has been engaged by Robt. Knight as general manager of his entire system of mills, comprising nearly 450,000 spindles.

—A. H. Blease, secondhand in weave room at Norris Cotton Mills, Cateechee, S. C., has resigned to accept a position with the Fulton Bag & Cotton Mills, Atlanta, Ga. He is succeeded by Henry Singleton of Newry, S. C.

—R. P. Scruggs has severed his connection with the Henrietta (N. C.) Cotton Mills No. 1 as superintendent. J. H. Pleasant has been appointed to succeed him.

—W. D. Jones has secured the superintendency of the Roanoke Mills Co., Roanoke Rapids, N. C., which position H. F. Moody has held for many years.

—John R. Rostern, superintendent of the Indian Head Cotton Mills, Cordova, Ala., has resigned, and H. F. Moody of Roanoke Rapids, N. C., has been appointed superintendent in his place.

—Samuel Austin has succeeded John M. Mehaffey as boss weaver at the Moore Cotton Mills, Taylorsville, N. C.

—J. A. South, formerly boss spinner with the Stonewall (Miss.) Cotton Mills, is now in charge of spinning at the Tuscaloosa (Ala.) Cotton Mills.

—Charles McDade, formerly of the Clifton Mills, is now with the Cowpens Mfg. Co., Cowpens, S. C., as overseer of weaving.

—Calvin Moore, night superintendent for the Efird Mfg. Co., Albermarle, N. C., has resigned.

—L. W. Buck, formerly with the Hocmuga Mill at Greensboro, N. C., has accepted charge of the Asheville Cotton Mills, Asheville, N. C.

—William G. Nichols, of Lowell, Mass., has removed to Chester, S. C., where he

has a position as secretary and treasurer of the Springstein Mills.

—Pythagoras Boyd, agent at the Arnold Print Works, North Adams, Mass., has resigned, as has also his brother, Cicero Boyd, foreman bleacher at the works, and John Boyd, chemist. Pythagoras Boyd has been connected with the works for about 20 years. F. B. Pearson, manager, will assume Mr. Boyd's duties with his own.

—J. E. Stott, formerly superintendent of the Eureka Mills, Chester, S. C., is now in charge of the spinning in the Acushnet Mills, New Bedford, Mass.

—S. E. Ervin is now running the carding and spinning at night in the Alpha Mills, Charlotte, N. C. He was formerly second boss at the American Spinning Co., Greenville, S. C.

—J. W. Broadnox, of Abbeville, S. C., is engaged as overseer of spinning in the Vesta Cotton Mills, Charleston, S. C.

—Robert Bradshaw has resigned as overseer of weaving at the Tecumseh Mill No. 2, Fall River, which position he held for many years. George Hodson has succeeded him.

—Robert Butler, boss carder and spinner at the Millfort Cotton Mill, Fort Mill, S. C., has been promoted to superintendent, in addition to his present duties.

—John Bray, formerly overseer of dyeing with the R. D. Mason Co., Pawtucket, R. I., has accepted a similar position with the Pawtucket Dyeing & Bleaching Works.

—A. B. Carter, of Salisbury, N. C., has accepted the position of overseer of spinning in the Charlotte Cotton Mills at Charlotte, N. C.

—Burton Crankshaw has succeeded Robert Wood as overseer of carding in the Mechanics Mill, Fall River, Mass.

—F. A. Cumnock has resigned as superintendent of the Pepperton Cotton Mills, Jackson, Ga., and returned to Charlotte, N. C.

—Henry Creekmore, formerly general night overseer at the Dover Yarn Mill, Charlotte, N. C., has been promoted to the position in charge of day spinning.

—William F. Fuquar, formerly in charge of the night spinning at the Highland Park Mfg. Co., Charlotte, N. C., is now day overseer of spinning.

—O. H. Farr, formerly night superintendent at the Roswell (Ga.) Cotton Mills, is now at the Avondale Mills, Birmingham, Ala., the former mills having shut down night work.

—G. Floyd has been appointed overseer of weaving at the Palmetto (Ga.) Cotton Mills, which position he held some years ago.

—R. T. Grant, boss weaver at the Pepperton Cotton Mills, Jackson, Ga., has resigned.

—Martin Guldbrandson, formerly of Fayetteville, N. C., is now at the Charlotte (N .C.) Cotton Mills filling the position of boss weaver.

—W. A. Gill, superintendent of the Asheville (N. C.) Cotton Mill, has been succeeded by Lyman W. Buck, manager of the Hocmuga Mills, Greensboro, N. C.

—A. B. Gossett, who has had charge of the weaving at the Cowpens (S. C.) Cotton Mills, has resigned to become boss weaver in the mill of the Mills Mfg. Co., Greenville, S. C.

—George I. Henry, for seven years overseer of weaving in the Shetucket Mill, Norwich, Conn., has resigned.

—J. W. Hawkins, for a number of years superintendent of the Wilmington (N. C.) Cotton Mills, on account of ill health, has given up that position and will take the position of designer for the same mills. J. H. McIlhaney, assistant superintendent, is now superintendent.

—Clarence L. Kent, formerly overseer of the dressing department at the Pemberton Mills, Lawrence, Mass., is now with the Pacific Mills in that city in the shipping department.

—W. H. Kingsley, who has been recently employed as overseer of weaving at the New York Mills, N. Y., has returned to the Farnumsville Cotton Mills, Farnumsville, Mass., where he was formerly employed, in a similar capacity.

—Hugh Kinniburgh, formerly with the Pawtucket Dyeing & Bleaching Co., Pawtucket, R. I., is now overseer of dyeing with the Fletcher Mfg. Co., Providence, R. I.

—A. H. Layton, overseer of dyeing at the Isaetta Mills, Augusta, Ga., has resigned.

—William Lee, for a number of years with the Clyde Bleachery & Print Works, River Point, R. I., has accepted a position as foreman of the finishing department at Allen's Print Works, Providence, R. I., where he will succeed J. D. Boothman.

—J. B. Moore, formerly boss spinner at the McColl (S. C.) Mfg. Co., has accepted charge of the Indian Creek Mills, Lincolnton, N. C.

—S. McClester, formerly with the Odell Manufacturing Co. at Concord, N. C., has been appointed overseer of weaving at the Wayne Cotton Mills, Goldsboro, N. C.

—J. W. Moore, boss carder at the Alpha Mills, Charlotte, N. C., has resigned.

—Aubrey Motz has been appointed superintendent of the Roswell (Ga.) Cotton Mills. He was formerly for two years master mechanic and assistant superintendent of the Courtenay Mfg. Co., Newry, S. C.

—W. E. Malloy, overseer of carding and spinning for the Manchester Mfg. Co., Macon, Ga., for six years, has resigned and is now overseer of carding at the Paragon Mills, Cedartown, Ga.

—William F. McClendon, of Eufaula, Ala., is now overseer of day spinning at the Norris Cotton Mills, Cateechee, S. C.

—J. C. Powers, overseer of the weaving department in the North Pownal (Vt.) Mfg. Co.'s mill, has accepted charge of the Eagle Cotton Mill in North Adams, Mass.

—W. E. Poag, formerly with the Odell Mfg. Co., Bynum, N. C., has accepted a position as carder and spinner at No. 2 mill of the Highland Park Mfg. Co., Rock Hill., S. C.

—H. C. Phillips, former superintendent at H. N. Slater's cotton mill, and later in charge of a plant in New York, has been appointed superinntendent of the Atlantic Cotton Mills at Lawrence, Mass.

—M. B. Pitts, of Anderson, S. C., has returned to Greenville, S. C., to fill the position of boss carder with the F. W. Poe Mfg. Co.

—J. F. Pennington, boss carder at the Edna Cotton Mills, Reidsville, N. C., is now at the Camden (S. C.) Cotton Mills in a similar position. On taking leave, he was presented with a gold watch chain and a diamond scarf pin.

—J. A. Pinchbeck is the new superintendent of the Maxton (N. C.) Cotton Mill.

—Fred H. Richardson, overseer in the weave room of No. 1 Mill of the Lonsdale Co., Lonsdale, R. I., has succeeded Luke Duxbury as overseer of the weave room in No. 4 mill. Luke Duxbury, who has been in the employ of the Lonsdale Co. for 40 years, is taking leave to engage in farming.

—Daniel S. Russell, for a number of years overseer of carding at the American Linen Mills, Fall River, Mass., has resigned.

—G. F. Roberts, of Columbus, Ga., has accepted a position as boss weaver with the Paterson Mfg. Co., China Grove, N. C.

—Jerry Sheehan has secured the position of secondhand in the weave room of No. 3 mill of the Warren Cotton Mills, West Warren, Mass.

—Oliver Tasker has resigned his position in charge of the carding, spinning, spooling, warping and cone winding with the Quinn Mfg. Co., Petersburg, Va.

—C. Upchurch has entered upon his new duties as superintendent of the carding and spinning at the Red Bluff Mills, Clio, S. C.

—W. B. Williams, of Pacolet, S. C., is engaged as overseer of weaving in the Vesta Cotton Mills at Charleston, S. C.

—Robert Wood has resigned his position as overseer of carding in the Mechanics Mill, Fall River, Mass., and has gone to the Davol Mills, where he is occupying a similar position.

—Lyman B. Williamson has been elected to the position of secretary and treasurere of the E. M. Holt Plaid Mills, Burlington, N. C., succeeding J. Harper Erwin.

—A. S. White has been employed by the Paterson Mfg. Co., China Grove, N. C., as overseer of carding. Mr. White was formerly with the Cannon Mfg. Co., Concord, N. C.

—William I. Walker, of Atlanta, Ga., has taken charge of all the spinning, spooling, warping, slashing and drawing-in at the Dwight Mfg. Co., Alabama City, Ala. He will also have charge of these departments in the new mill of the Dwight Mfg. Co.

—George F. Wright, assistant superintendent at the Galveston (Texas) Cotton Mills, has been appointed overseer of weaving and finishing. C. R. Chase has succeeded him as assistant superintendent.

Woolen

—C. W. Heritage, formerly assistant superintendent at the Merchants' Woolen Mill, Dedham, Mass., has been engaged as superintendent and designer by William Carson, Lenni, Pa.

—Thomas Curran, formerly with the Hampden (Mass.) Woolen Co., as boss wool sorter, is now with the Dawson Mfg. Co., Holden, Mass.

—Patrick Fagan has resigned as boss dresser for the Lippitt Woolen Co., Woonsocket, R. I.

—W. H. Goodwin, who was employed in the office of the Washington Mills, Lawrence, Mass., has accepted a position in New York in the office of the American Woolen Co., which recently purchased the Washington Mills.

—Ernest Hogg, overseer in Stephen Sanford & Sons' mill, Amsterdam, N. Y., has severed his connection with that mill to engage in another line of business in Seattle, Wash. He is the eldest son of Superintendent James Hogg.

—P. Joyce, overseer of carding for W. S. & F. Cordingley, Newton Lower Falls, Mass., has resigned and returned to the Hawthorne Mills, Glenville, Conn., in a similar capacity.

—William H. Leyfield, formerly of Schaghticoke, N. Y., is now overseer of the finishing department of L. L. Allen & Bros.' woolen mill at Rochester, N. Y.

—Joseph Maguire is the new overseer of carding at the Summit Woolen Co., Staffordville, Conn. Mr. Drury, formerly overseer of carding, has gone to Killingly, Conn.

—Charles Pickles, formerly at the Stevens Mills, Franklin Falls, N. H., is now boss finisher for the Concord Mfg. Co., Penacook, N. H.

—George Walker is foreman of the hard silk department of Gallant Bros.' silk mill at Delhi, N. Y.

Knit.

—M. W. Brooks has resigned as superintendent of the Plainville Mfg. Co., Plainville, Conn., and has removed to Utica, N. Y., where he has accepted a position with one of the large knit goods concerns in that city.

—W. H. Slater, for a number of years boss spinner of the Tivoli Knitting Mills, Cohoes, N. Y., is now in a similar position at the Commercial Knitting Mills, Troy, N. Y.

—J. A. Burleigh, formerly connected with the Victor Knitting Co. and later with the American Knitting Machine Co. of Providence, has severed his connection with that concern, and is now with the American Linen Fibre Co.

—John C. Calhoun is now overseer for the Victor Knitting Mills Co., Cohoes, N. Y., succeeding Frank Kittle.

—Charles Ham has resigned his position with the Himes Underwear Co., and accepted head machinist place with Fuld & Hatch of Albany, N. Y.

—Joseph Midgley is now employed as dyer with the Fitch Mfg. Co., Thornton, R. I.

Deaths.

—Col. James M. Wesson, founder of the town of Wesson, Miss., and owner of the first cotton and woolen mill in Mississippi, died recently in that town, aged 81 years. During the war he supplied the Confederate army with cloth and his property was destroyed by the Union army. In 1870 he established the mill at Wesson which is now known as the Mississippi Mills.

—George Sutherland, Sr., for 60 years a resident of Clinton, Mass., died at his home on High St., May 3rd, after a lingering illness. Mr. Sutherland was born in Scotland, but came to this country when very young. For a short time he worked in the Lancaster Mills, and then for 40 years was overseer in the carpet mills here, retiring three years ago.

—Benjamin Allen died at his home, 304 Wister St., Philadelphia, May 4th, in his 68th year, his death being due to heart failure and a general breaking down of the system, his wife's death in October last having been a great shock to him, from which he never recovered. Mr. Allen was born in Nottingham, Eng., on May 22nd, 1831, and came to this country in 1843, shortly after entering the woolen business with his father, William Allen, which he succeeded to in 1864, starting the J. & B. Allen Hosiery & Knit Goods Mills. He was a trustee and director of a number of insurance companies, banks and other institutions, and was also prominent in social life. Three sons and one daughter survive him.

—Benjamin Eastwood, a prominent silk machinery manufacturer of Paterson, N. J., died at his home in that city recently after a short illness. He was born in Lancashire, Eng., on October 31st, 1839, coming to this country when 27 years old. He started a shop for the manufacture of silk machinery in 1873 on Van Houten St., this very soon becoming too small, owing to the increased demand for his machinery, and he removed to the Beaver Mill and two years later built a shop on Ramapo Ave. This plant has been steadily extended until today it is one of the largest and best equipped in the country. In 1888 he built a silk mill on Ramapo Ave. on the English plan. He leaves a widow, two sons and one daughter.

—Joseph D. Beattie died recently after a long illness. He was a brother of T. W. Beattie, superintendent of the Old Town Woolen Mill, Old Town, Me., and was assistant superintendent of that mill until he was obliged to resign owing to poor health. He took an active interest in the organization of the Ounegan Woolen Mill Co. at Old Town, the mill now being under construction and of which he expected to be superintendent.

—Alexander Ewing, one of the oldest and most respected citizens of Athens, Ga., died suddenly at his home of heart failure. From 1868 to 1872 he was engaged in the manufacture of woolen goods in the Herrold Woolen Mills, this city, in 1872 being appointed deputy county auditor and served in that capacity until October, 1896. For 24 years he was also clerk of Athens township, which position he held at the time of his death and in which he proved himself to be most faithful and trustworthy.

—Mortimer Wastcoat, a prominent mill man of Taunton, Mass., died at his home on Middleboro Ave. in the afternoon of April 27th. He was connected with Col. Peter H. Corr in many of the latter's financial enterprises and was clerk of the Corr Mills, a director of the Standard Oilcloth Co. and a stockholder in several local mills.

—John A. Ryan, superintendent of Crosby's Woolen Mill in East Glastonbury, Conn., was struck by a car on the Hartford, Manchester and Rockville line in Manchester, Saturday night, May 6th, and instantly killed. Why he was between the rails is a mystery. Mr. Ryan was for some years employed as designer at the New England Mills in Rockville; later, for seven years, was superintendent of the American Mills, and then went to Lowell as superintedent of the Faulkner Mills, from whence he came to Glastonbury about a year ago. His wife and four children survive him.

—James E. McDowell, treasurer of the Indian Spring Mill, Madison, Me., died at his home in Portland, May 17. For a number of years he was engaged in the cooperage and lightering business in Cuba, but retired in 1889.

—Sidney E. Haigh, a prominent citizen of Madison, Ind., and superintendent of the Ross Textile Mfg. Co., died Saturday night, May 6th, while en route home from a business trip in the East with Mr. John I. Ross. The cause of his death was heart failure. For years back the Haighs have been woolen manufacturers. Mr. Haigh's father was engaged, with the late Joe Schofield, father of John T. Schofield, in the woolen manufacturing business, and established the Madison Woolen Mills. Subsequently Mr. Schofield withdrew from the firm and established the mill now operated by his son and grandson in Madison. Mr. Haigh was a prominent figure in many enterprises, notably in the establishment of the Ross Textile Mfg. Co., the Eagle Cotton Mills, construction of the Grand Opera House, and the free public library in the city is largely indebted to him for its success.

—John Morse, boss spinner of No. 4 mill of C. H. & F. H. Stott, Stottville, N. Y., died recently of pneumonia. He has been connected with this mill 25 years.

—Shubael Hutchins, for many years a well-known cotton broker of Providence, R. I., died April 24th, aged 74 years.

All Belts with CLING-SURFACE on them can be run as slack as this.

This Little Belt (12 in.) was our first slack belt. It earned $640.00 in two years, in increased power, at a cost of only $63.00 for CLING-SURFACE, for the whole plant.

WE GUARANTEE

That with the use of CLING-SURFACE all belts will STOP slipping, that THE POWER WILL BE PERMANENTLY INCREASED, that belts can be run SLACK, that in leather belts the leather will become as SOFT as calfskin and ABSOLUTELY WATERPROOF; and furthermore that the INCREASE in power in a fair-sized plant will earn the cost of the sample can EVERY month, if used as directed. This applies to all belts, leather, rubber, cotton or a rope drive, whether they are new, old or oily.

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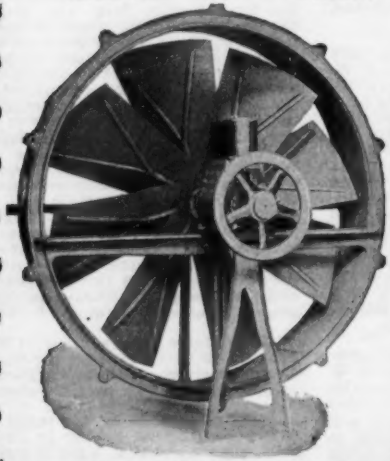

BUFFALO ENGINE DISK WHEEL.

Buffalo Forge Company,

BUFFALO, N. Y., U. S. A.

NEW YORK. CHICAGO.

BUYERS' INDEX.

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

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American Moistening Co., 150 Devonshire St., Boston.

Architects and Mill Engineers.
Berlin Iron Bridge Co. The, East Berlin, Ct.
Ferguson, John W., Paterson, N. J.
Tower & Wallace, Broadway and 25th St., New York, N. Y.

Automatic Feeds for Cotton and Wool.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Balling Machine.
Torrance Mfg. Co, 18 Davis St, E. Newark, N. J.

Bandings.
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Belting.
Albany Belting & Supply Co., Albany, New York.
Alexander Bros., 410 No. 3d St., Phila., Pa.
Link Belt Machinery Co., Chicago, Ill.
Popham, Henry, & Son, Newark, New Jersey.
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Belt Dressing.
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Cling Surface Co., 168 Virginia St., Buffalo, N. Y.

Belt Hooks.
Field, Frank E., New Haven, Conn.

Bindings.
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Bleaching Materials.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Bobbin Holder and Thread Catcher.
Burr Bobbin Holder and Thread Catcher Co, Hartford, Conn.

Bobbins, Spools, Shuttles, Etc.
Nashua Spool and Bobbin Co., Nashua, N.H.
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Brushers.
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Burr Pickers.
Curtis & Marble Machine Co., Worcester Mass.
Sargent's, C. G., Sons, Graniteville, Mass.

Card Clothing.
Ashworth, Elijah, Fall River, Mass.
Leigh, Evan A, 35 Mason Building, Boston.

Calico Printers' Machinery and Supplies.
Birch Brothers, Somerville, Mass.
Butterworth, H. W., Sons & Co., Philadelphia.
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See also Dyeing, Bleaching Machinery, etc.

Carders' Tools.
Brown, W. H, Mechanic St, Worcester, Mass.

Carpet Machinery.
Altemus, W. W, & Son, 2816 N. 4th St, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Ms.
Furbush, M. A, & Son, Machine Co, Phila, Pa.
Granger Foundry & Machine Co., Providence, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Chemicals and Apparatus.
Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Chemist.
Adriance, John S., 105 East 39th St., New York.

Combs (Wool and Cotton).
Crabb, William, & Co, Newark, N. J.

Commission Merchants (Dry Goods).
Dusenbury, C Coles, & Son, 396-398 Broadway, New York.
Hayes, O. H., 10 Thomas St., New York.

Copper (Perforated.)
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Copper Print Rollers.
New Bedford Copper Co, New Bedford, Mass.
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Copper Work for Dyers.
Butterworth, H. W. & Sons Co., Philadelphia.
Burkhard, Thomas, 494 Flushing Ave., Brooklyn, N. Y.
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Phillips Co, The Thomas, Providence, R. I.

Cotton (Egyptian).
Stoddard, Haserick, Richards & Co., Boston.

Cotton Machinery.
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Ashworth, Elijah, Fall River, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Han-

cock and Somerset Sts, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Whitin Machine Wks, Whitinsville, Mass.
Woonsocket Machine & Press Co, Woonsocket, R. I.

otton Openers and Lappers.

Howard & Bullough American Machine Co, Pawtucket, R. I.

Cutters for Knit Fabrics.

Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y

Designer.

William Keiller, 28 Queen St., Belfast, Ire.

Dextrine.

Stein, Hirsh & Co, 165 Duane St., New York.

Dryers.

Birch Brothers, Somerville, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Kenyon, D. R. & Son., Raritan, N. J.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Dusters.

See Wool and Waste Dusters.

Dyers, Bleachers and Finishers.

American Woolen Finishing Works, 164 High St., Boston.
American Yarn Printing Works, 134-150 North 22d st., Philadelphia.
Boston Finishing Works, Williamstown Mass.
Brophy's, T, Sons, Jasper St, Philadelphia.
Cohoes Dye Works, Cohoes, N. Y.
Cranston Worsted Mills (yarns), Bristol R. I.
Firth & Foster Co, Kensington, Pa.
Greenwood, R. & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.
Littlewood, G. J., & Sons, Manayunk, Pa.
Novelty Dye Works, Cincinnati, Ohio.
Orianna Bleach Works, 2590 No. 3d St., Philadelphia.
Pawtucket Dyeing & Bleaching Co, Pawtucket, R. I.
Rowland, Samuel, Schuylkill Haven, Pa.
Warren, W, Thread Works, Westfield, Mass.

Dyeing, Drying, Bleaching and Finishing Machinery.

Birch Bros., Somerville, Mass.
Butterworth, H. W, & Sons Co, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Co, 22 and Wood Sts, Philadelphia.
Granger Foundry & Machine Co, Providence, R. I.
Hopkins, A, & Co, Bridgeton, R. I
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Kenyon, D. R. & Son, Raritan, N. J.
Lincoln, The, Co, 54 Arch St, Hartford, Ct.
Phenix Iron Foundry, Providence, R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
Phillips, The Thomas Co, 91-95 South Main St, Providence, R. I.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Woonsocket Machine & Press Co, Woonsocket, R. I.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Dye Sticks,

Bailey, Frank, Cedar Brook, New Jersey.
Haedrich, E. M, 311 1-2 Walnut St, Phila, Pa.

Dyestuffs and Chemicals.

Amend Process Co., 205-211 Third Ave., New York.
American Aniline Co., 138 No. Front St., Philadelphia.
Anchor Color Mfg. Co, 464 Cherry St, New York.
Atteaux, F. E. & Co., 174-176 Purchase St., Boston.
Berlin Aniline Works, 72 Front St., N. Y.
Bischoff, & Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Corey, S. J, 273 Congress St, Boston.
Dillon & Co, 20 Cedar St, New York.
Farbenfabriken of Elberfeld Co, 40 Stone St, N. Y.
Geisenheimer & Co, 189 Front St, New York.
Innis & Co, 3 Cedar St, New York.
Jaeck Bros., The, Co., 62-68 No. 11th St, Brooklyn, N. Y.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y.
Johnson, Wm. G, & Co, Uncasville, Conn.
Keller, John J, & Co, 104-106 Murray St, N. Y.
Klipstein, A, & Co, 122 Pearl St, N. Y.
Koechl, Victor, & Co, 122 Hudson St, N. Y.
Matheson, W. J, & Co, 182-184 Front St, N.Y.
Merrimac Chemical Co, Boston, Mass.
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Palmetto Co., The, 942 44 Drexel Building, Philadelphia.
Pickhardt & Kuttroff, New York.
Richmond & Foley, 133 N. Front St., Philadelphia.
Roessler & Hasslacher Chemical Co, 100 William St., New York.
Sharpless Dye Wood Ext. Co, 22 N. Front St, Phila, Pa.
Stamford Mfg. Co, 133-137 Front St., N. Y.
Stone & Ware Co, The, 157 Maiden Lane, N. Y.
Sykes & Street, 85 Water St, N. Y.
Thomas, N. Spencer, Elmira, New York.

Edgings.

See Tapes, Braids and Edgings.

Electrotyping and Printing.

Whitcomb, H. C, & Co, Boston.

Elevators.

Cohoes Foundry & Machine Co, Cohoes, N.Y.
Eastern Machinery Co, The, New Haven, Conn.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Engineers, Mechanical.

Ferguson, John W, Paterson, N. J.

Express Money Orders and Travelers' Cheques.

American Express Co, offices in every city

Fans—Exhaust and Ventilating.

See Ventilating Apparatus.

Feed Water Heaters.

Kelley, Benj. F. & Son, 91 Liberty St., New York.

Feed Water Pumps.

Goulds Mfg. Co, Seneca Falls, N. Y.
Phœnix Iron Foundry, Providence, R. I.

Finishing Machinery.

See Dyeing, Drying, Bleaching and Finishing.

Fluted Rolls.

Cohoes Foundry & Machine Co, Cohoes, N.Y
Thurston, A. G, & Son, Box 528, Fall River Mass.

Fulling Mills for Woolen Goods.

Hopkins, A, & Co, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass.

Gas Engines.

Jones, Lewis, 60½ and Media Sts, Phila, Pa.

Gas Singeing Machines.

Birch Brothers, Somerville, Mass.
Butterworth, H. W. Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Ms.
Granger Foundry & Machine Co., Providence, R. I.

Gear Cutting Machine.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E, Co, New London, Conn.

Grates (Boiler).
Earl & Wilson Co, Gastonia, N. C.

Harness Varnish.
D. L. Witmer & Bro, 5th St. and Germantown Ave, Philadelphia.

Heating.
See Ventilating.

Heddles.
Watson, L. S, Mfg. Co, Leicester, Mass.

Hosiery Boards.
Pearson, J. T, Kensington, Pa.

Hydro Extractors.
American Tool & Machine Co., Boston.

Ink, Stamping.
Witmer, D. L, & Bro, 5th St. and Germantown Ave, Philadelphia.

Insurance (Employers' Liability).
Employers' Liability Assurance Co, 28 Central St, Boston, Mass.

Knit Goods Edgings, Trimmings, etc.
Cathcart, John & Co., 115 Franklin St., New York.
Cheney Bros, Silk Goods, 479 Broome St, N. Y.
Friedberger & Co, Edgings, Germantown Phila, Pa.
Hepner & Horwitz, Lacings, 30 Howard St, N. Y.
Krout & Fite Mfg. Co, Allegheny Ave. and Emerald St., Phila.
Weimar Bros, 1817 East York St, Phila. Pa.

Knit Goods Finishing Machines, Crochet, Etc.
Excelsior Sewing Machine Co, 120 N. 7th St, Phila, Pa.
Merrow Machine Co, The, Hartford, Conn.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 2079 E. Cumberland St, Phila Pa.

Knitting Machine Cylinders.
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Machinery.
Beattie Machine Works, Cohoes, N. Y.
Branson Machine Co., 506 John St., Philadelphia.
Campbell & Clute, Cohoes, N. Y.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Excelsior Knitting Machine Manufacturing Co., Allentown, Pa.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos. (Cutters, etc.), Cohoes, N. Y.
Leighton Machine Co, Manchester, N. H.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
McMichael & Wildman Mfg. Co, Norristown, Pa.
Mueller, A, 760 Lexington Ave, Brooklyn, N. Y.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 127 Bread St, Phila, Pa.
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 2079 E. Cumberland St., Phila., Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Needles and Supplies.
Breedon, Wm, & Son, Amsterdam, N. Y.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Crane Mfg. Co., Lakeport, N. H.
Dodge Needle Co., Manchester, N. H.
Ives, Loyal T, New Brunswick, N. J.
Lydall, H, & Foulds, Manchester, Conn.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.
Bullock & Crenshaw, 528 Arch St. Phila, Pa.

Lamps, Electric.
Edison, Thomas A., Jr., 27 William St., New York.

Looms.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1785 Barker St, Phila, Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A., 35 Mason Bldg., Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Ms,
Woonsocket Machine & Press Co, Woonsocket, R. I.

Lubricators.
Ameledema Oilless Bearing Co., Berkeley St, Wayne Junction, Philadelphia.
Dixon, Jos., Crucible Co, Jersey City, N. J.
Graphite Lubricating Co., Bound Brook, N. J.

Lumber.
Stearns, A. T, Lumber Co, Neponset, Mass.

Lumpers.
Gerry, George, & Son, Athol, Mass.

Machinery Dealers.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.

Machinists' Tools.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E. Co, New London, Conn.

Mails.
Walder, J, Paterson, N. J.

Measuring and Folding Machines.
Curtis & Marble Machine Co, Worcester, Ms.
Elliott & Hall, 544 Hermon St, Worcester Mass.

Mercerizing Machinery.
Butterworth, H. W. & Sons, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.

Mills For Sale.
Denny, R. B., 143 Federal St., Boston.

Mill Builders and Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct
Ferguson, John W, Paterson, N. J.

Mill Supplies.
American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Bristol, The, Co., Waterbury, Conn
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Mitchell-Bissell Co., 170 Summer St., Boston.
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg. Co, Leicester, Mass.

Napping Machines.
American Napping Machine Co, Williamstown, Mass
Ardrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Noils (Silk.)
See Novelty Yarns, Tinsels, Silk Noils, etc.

Pantagraphs for Mill Engraving.
Johnson, C. A, & Co, 22 Dey St, New York.

Patterns of European Novelties.
European Pattern Supply Co., 530 Broadway, N. Y.
European Textile Sample Co., 56 Worth St., New York.

Patent Solicitors.
Crosby & Gregory, 34 School St, Boston, Mass.
Wright, Brown & Quinby, 53 State St, Boston, Mass.

Perforated Metal.
Beckley, A. J. & Co., Garwood, N. J.
Harrington & King Perforating Co., 230 North Union St, Chicago, Ill.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co., 100 William St, New York.

Picker Sticks.
La Bar, L. F., Beateyestown, N. J.
Loom Picker Co., Biddeford, Me.

Picking, Carbonizing and Garnetting.
Garfield Woolen Co, Garfield, N. J.

Pipe Covering (Magnesia).
Keasby, R. A., 83 Warren St, New York.

Pneumatic Conveying.
See Ventilating.

Porcelain Guides.
Mitchell-Bissell Co., 170 Summer, St., Boston.

Power Transmitting Machinery.
Ameledema Oilless Bearing Co. 149 West Berkley St, Wayne Junction, Pa.
Channon, H, Co, 25 Market St, Chicago, Ill.
Christiana Machine Co., Christiana, Pa.
Eastern Machinery Co, New Haven, Conn.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jones, W. A, 53-59 South Jefferson Street, Chicago, Ill.
Kilburn, Lincoln & Co, Fall River, Mass.
Link Belt Machinery Co, Chicago, Ill.
Saginaw Manufacturing Co., Saginaw, Mich.
Wall, William F. Rope Company, 56 South St., New York.

Presses.
Boomer & Boschet Press Co., 338 West Water St., Syracuse, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia
Crawford, J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Hart, Charles, Frankford, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Phillips Co, The Thomas, Providence, R. I.
Sullivan Machinery Co., Claremont, N. H.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Pressing Irons, Gas and Air Heated.
Economical Gas Iron Co., C. H. Sheftall, Mgr., 305 307 Mercer St., New York.
Edwards Sad Iron Co, 1420 Chestnut St., Philadelphia.

Printers and Embossers.
Novelty Textile Printing Co, 447-449 W. 14th St, New York.

Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.

Quills.
Parker, Henry, Co., Springfield, Vt.

Reed and Harness Manufacturers.
American Supply Co, Providence, R. I.
Walder, J, Paterson, N. J.

Ribbons.
Cheney Bros, S. Manchester, Ct.

Roofing, Gravel, Slag and Composition.
Armitage Mfg. Co, Richmond, Va.
Eastern Granite Roofing Co., Jersey City, N. J.

Roofing, Paint and Paper.
Armitage Mfg. Co, Richmond, Va.

Roving Cans and Sheet Metal Work for Mills.
N. E. Ventilating & Heating Co, 930 Manton Ave. Providence, R. I.
Sullivan Machinery Co, Claremont, N. H.
Walrus Fibre Mfg. Co., Medford, Mass.

Schools.
Lawrence Scientific School, Cambridge, Mass.
Lowell Textile School, Lowell, Mass.
New Bedford Textile School, New Bedford, Mass.
Philadelphia Textile School, Phila, Pa.

Screens (Perforated.)
See under Perforated Metal.

Sewing Machines and Supplies.
Birch Bros., Somerville, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Frame, Gibbons, 2nd and Diamond Sts, Phila, Pa.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Nye & Tredick, 606 Arch St, Phila, Pa.
Standard Sewing Machine Co, Cleveland, Ohio.
Scott & Williams, 6th and Arch Sts, Phila, Pa.
Union Button Sewing Machine Co., 164 High St., Boston, Mass.

Shearing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Shell Rolls.
Cohoes Foundry & Mach. Co, Cohoes, N. Y.
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Shoddies.
See Wool Shoddies.

Shuttles.
See Bobbins, Spools, Shuttles, Etc.

Shuttle Eyes.
Mitchell-Bissell Co., 170 Summer Street, Boston

Silk Machinery.
Butterworth, H. W. Sons Co, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Mason Machine Works, Taunton, Mass.

Singe Plates.
Butterworth, H. W. Sons Co., Philadelphia.
New Bedford Copper Co, New Bedford, Mass

Sizing, Starch and Gums.
Quaker City Chemical Co., Wayne Junction, Philadelphia
Stein, Hirsch & Co, 165 Duane St, New York.

Slashers.
Cohoes Foundry & Machine Co, Cohoes, N. Y.
Lowell Machine Shop, Lowell, Mass.
Phillips Co. The Thomas, Providence, R. I.

Soaps.
Holbrook Manufacturing Co., New York.
India Alkali Works, Boston, Mass.

Spindles.
Bamford & Smith, Pascoag, R. I.
Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Ward & Vandegrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

Spindle Tubes.
Bamford & Smith, Pascoag, R. I.

Spinning Cylinders.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Spinning Frames.
See Cotton Machinery.

Spinning Frames for Wool
Woonsocket Machine and Press Co., Woonsocket, R. I.

Spinning Rings.
Draper Company, Hopedale, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.

Spinning Tubes.
Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Steam Boilers.
Brown, C. H, & Co, Fitchburg, Mass.

Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co. Hartford, Conn.
Mutual Boiler Insurance Co, 31 Milk St, Boston.

Steam Engines.
Brown, C. H, & Co, Fitchburg, Mass.
Buffalo Forge Co., Buffalo, N. Y
Hooven (The), Owens & Rentschler Co, Hamilton, O.
Sturtevant, B. F. & Co., Boston.

Steam Specialties.
Butterworth, H. W. Sons Co., Philadelphia.

Tanks, Tubs and Vats.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Challenge Wind Mill & Feed Mill Co, 195 High St, Boston, Mass.
Corcoran, A. J, 11 John St, New York.
Cypress Lumber Co, Apalachicola, Fla.
Stearns, A. T, Lumber Co, Neponset, Mass.
Woolford, George, 2240 No. 9th St, Phila, Pa

Tapes, Braids and Edgings.
Cathcart, John, & Co, 115 Franklin St, N. Y.
Fleming & Chapin, 249 Church St., Phila.
Friedberger & Co, Germantown, Pa.
Hamilton, J. H , & Co, 275 Church St, N. Y.
Krout & Fite Mfg. Co., Allegheny Ave. and E. Gerard St., Philadelphia.
Weimar Bros, 1817 East York St, Phila, Pa.
Young, Wm. M, 3638-40 Frankford Ave, Philadelphia, Pa.

Telephones.
F O. Plummer, 620 Atlantic Ave., Boston.

Tentering Machines.
See Dyeing, Bleaching Machinery, Etc.

Tension Pulleys.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Testing Machines.
Howard, Geo. C., 1783 Barker St., Phila., Pa

Towers.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Challenge Wind Mill & Feed Mill Co, Boston, Mass.

Traveler's Cheques.
American Express Company.

Turbines.
(See Water Wheels.)

Ventilating Apparatus.
Allington & Curtis Mfg. Co , Saginaw, Mich., and East Cambridge, Mass
Berger Bros. Co., 231-237 Arch St., Philadelphia.
Berry, A. Hun, 23 W. 1st St, Boston, Mass.
Buffalo Forge Co., Buffalo, N. Y.
New England Ventilating & Heating Co, Providence, R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Washers (Cloth).
Birch Brothers, Somerville, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Hopkins, A, & Co, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Phillips Co, The Thomas, Providence, R. I.

Watches and Clocks.
Elgin National Watch Co., Elgin, Ill.

Watchman's Clock.
Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Nans & Co, 116A Chambers St, New York.

Water Wheels.
Bradway, C. P., W. Stafford, Ct.
Christiana Machine Co., Christiana, Pa.
Humphrey Machine Co., Keene, N. H.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, O.

Water Wheel Governors.
Bradway, C. P, West Stafford, Ct.
Cohoes Foundry & Machine Co, Cohoes N. Y.
Leffel, James & Co, Springfield, Ohio.
Lombard Water Wheel Governor Co, 61 Hampshire St, Boston.

Winders. (Hosiery.)
Universal Winding Co, 226 Devonshire St, Boston.

Wood Pulleys.
Saginaw Manufacturing Co, Saginaw, Mich.

Wool.
Pratt, Daniel S., 180 Summer St, Boston

Wool Cleaning Compound.
India Alkali Works, Boston.

Wool Combing Machinery.
Leigh, Evan A. 35 Mason Bldg., Boston.

Wool Extracts.
Garfield Woolen Co, Garfield, N. J.

Wool and Waste Dusters.
Gerry, Geo, & Son, Athol, Mass.
Sargents', C. G., Sons, Graniteville, Mass.
Stillman-Randall Machine Co, Westerly, R. I.

Woolen and Worsted Machinery.
Altemus, W. W, & Co, 2316 N. 4th St, Phila Pa.
American Tool and Machine Co., Boston.
Atlas Manufacturing Co , Newark, N. J.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. sons Co., Philadelphia.
Cobb, Thad. S., Machinery Co., Lowell, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A. & Son Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas. Machine Co. No. Adams, Mass.
Jefferson, Ed. & Bro. 28 Strawberry St, Phila, Pa.
Kenyon D. R. & Son, Raritan, N. J.
Leigh, Evan A. 35 Mason Bldg, Boston.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Philadelphia.
Phillips Co. The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Woonsocket Machine & Press Co Woonsocket, R. I.
Woonsocket Napping Machine Co., Woonsocket, R. I.

Wool, Hair and Noils.
Becker, Chas. W, Agt, Amsterdam, N. Y.
Fowles & Co, 106 Church St, Phila.

Wool Shoddies.
Becker, Chas. W, Agt, Amsterdam, N. Y
Garfield Woolen Co, Garfield, N. J.
Slack, Wm. H. B., & Bro, Springfield, Vt.

Wool Sorters, Scourers and Carbonizers.
Morse Wool Treating Co., Norton, Mass.

Wool Washing, Preparing and Drying Machinery.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Phillips Co, The Thomas, Providence, R. I
Sargent's, C. G, Sons, Graniteville, Mass.

Woolen Commission Merchants.
Dusenberry, C. Coles, 396 Broadway, New York.
Hayes, O. H. & Co., New York.

Yarns, Threads, Etc.

Banding.

Moore, C. & Co, 12 S. 5th St, Phila, Pa.
Warren, W, Thread Works, Westfield, Mass.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Cotton Yarns.

American Cotton Yarn Exchange, 45 Milk St., Boston.
Catlin & Co, New York and Boston.
Clark, Wm. Co, Westerly, R. I.
Cohannet Mills, Taunton, Mass.

Crossland, Enos, Sons, Philadelphia, Pa.
Dana Warp Mill, Westbrook, Me.
Eddy & Street, Providence, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fleming & Chapin, Philadelphia.
Germantown Spinning Co, Germantown. Pa.
Grant Yarn Co, Fitchburg, Mass.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hadley Co, Holyoke, Mass.
Indian Orchard Co., Indian Orchard, Mass.
Jenckes, E., Mfg. Co., Pawtucket, R. I.
Mitchell, Jas. E, & Co, Boston and Phila, Pa.
Montgomery, J. R, Co, Windsor Locks, Ct.
Monument Mills, Housatonic, Mass.
Orswell Mills, Fitchburg, Mass.
Sanford Spinning Co, Fall River, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Gassed Yarns.

Greene & Daniels Mfg. Co, Pawtucket, R. I.

Glazed Yarns.

Eichmann & Sternberg, 530 Broadway, cor Spring St., N. Y.
Indian Orchard Co., Indian Orchard, Mass.
Malcolm Mills Co, Frankford, Pa.
Meyer, John C. & Co., 87 Summer St., Boston.
Montgomery & Co, J. R, Windsor Locks, Ct.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Harness Twines.

Cranston Worsted Mills, Bristol, R. I.
Fawcett, Hughes, 115 Franklin St., N. Y.
Hadley Co, 95 Milk St, Boston, Mass.
Moore, C., & Co., (S. W. cor. 5th and Market Sts.)
Warren, W, Thread Works, Westfield, Mass
Whittier Cotton Mills, Lowell, Mass.

Hosiery and Knitting Yarns.

Boyer, B. F, & Co, Camden, N. J.
Campbell, Geo. & Co, Phila, Pa.
Champlain Silk Mills, Whitehall, N. Y.
Clark, Wm, Co, Westerly, R. I.
Clasgens, The J. & H. Co, New Richmond, Ohio.
Cohannet Mills, Taunton, Mass.
Colchester Mills, 86-88 Franklin St, New York.
Cranston Worsted Mills, Bristol, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St , N. Y.
Germantown Spinning Co, Germantown, Pa.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E., Manufacturing Co, Pawtucket, R. I.
Mitchell, James E, & Co, Phila. and Boston
Monument Mills, Housatonic, Mass.
Orswell Mills, Fitchburg, Mass.
Sanford Spinning Co, Fall River, Mass.
Skerry, A T, & Co, 47 Leonard St, N. Y.
Walcott & Campbell Spinning Co, New York Mills, Oneida Co, N. Y.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Flax, Hemp, Jute and Ramie.

Eichman & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fawcett, Hughes, 115 Franklin St., N. Y

Mohair Yarns.

Cranston Worsted Mills, Bristol, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Novelty Yarns, Tinsels, Silk Noils, Etc.

Champlain Silk Mills, Whitehall, N. Y.
Cranston Worsted Mills, Bristol, R. I
Eichmann & Sternberg, New York City.
Indian Orchard Co., Indian Orchard, Mass.
Malcolm Mills Co, 229 Chestnut St, Phila, Pa
Montgomery & Co, J. R, Windsor Locks, Ct.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Silk Yarns.

Champlain Silk Mills, Whitehall, N. Y.
Cheney Bros, S. Manchester and Hartford Ct.
Eddy & Street, Providence, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Meyer, John C, & Co., 87 Summer St., Boston.
Ryle, Wm, & Co, 54 Howard St, N. Y.

Woolen and Merino Yarns.

Boyer, B. F, & Co, Camden, N. J.
Clasgens, The J. & H. Co, New Richmond, Ohio.
Crossland's Enos, Sons, Philadelphia.
Eddy & Street, Providence, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E. Mfg. Co., Pawtucket, R. I.
Rockwell, Edward M, Leominster, Mass.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

Worsted Yarns.

Alleghany Worsted Mills, Phila, Pa.
Boyer, B. F, & Co, 516 Market St, Philadelphia, Pa.
Campbell, Geo. & Co, Phila, Pa
Campion, Richard, 17 Bank St., Philadelphia.
Cranston Worsted Mills, Bristol, R. I.
Croft, Howland, & Sons, cor. Broadway and Jefferson Ave., Camden, N. J.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Elsasser, Albert R, Addingham, Pa.
Goff, D. & Sons, Pawtucket, R. I.
Herbst & Jones, 21st and Naudain Sts, Philadelphia, Pa.
Pocasset Worsted Co., Thornton, R. I.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Waverly Worsted Co, Main St. and Green Lane, Manayunk, Pa.

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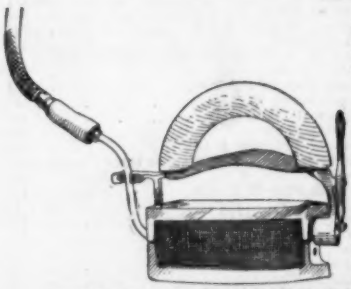
MILLS FOR SALE! Woolen Mills and other manufacturing plants Agent for Sale of Mill Properties.
R. B. DENNY, 143 Federal St., BOSTON, MASS.

"PERFECTION" SELF HEATING SAD IRONS.

The Greatest Labor Saving Device of the 19th Century.



Heats in two minutes. It is an ideal Iron, insuring comfort and saving time, labor and expense. No more sweltering over hot stoves. No soot, no dirt, no smell. No waste of fuel. No lost time.

Burns 2 ft. of Gas per hour, 2 cts. per day.

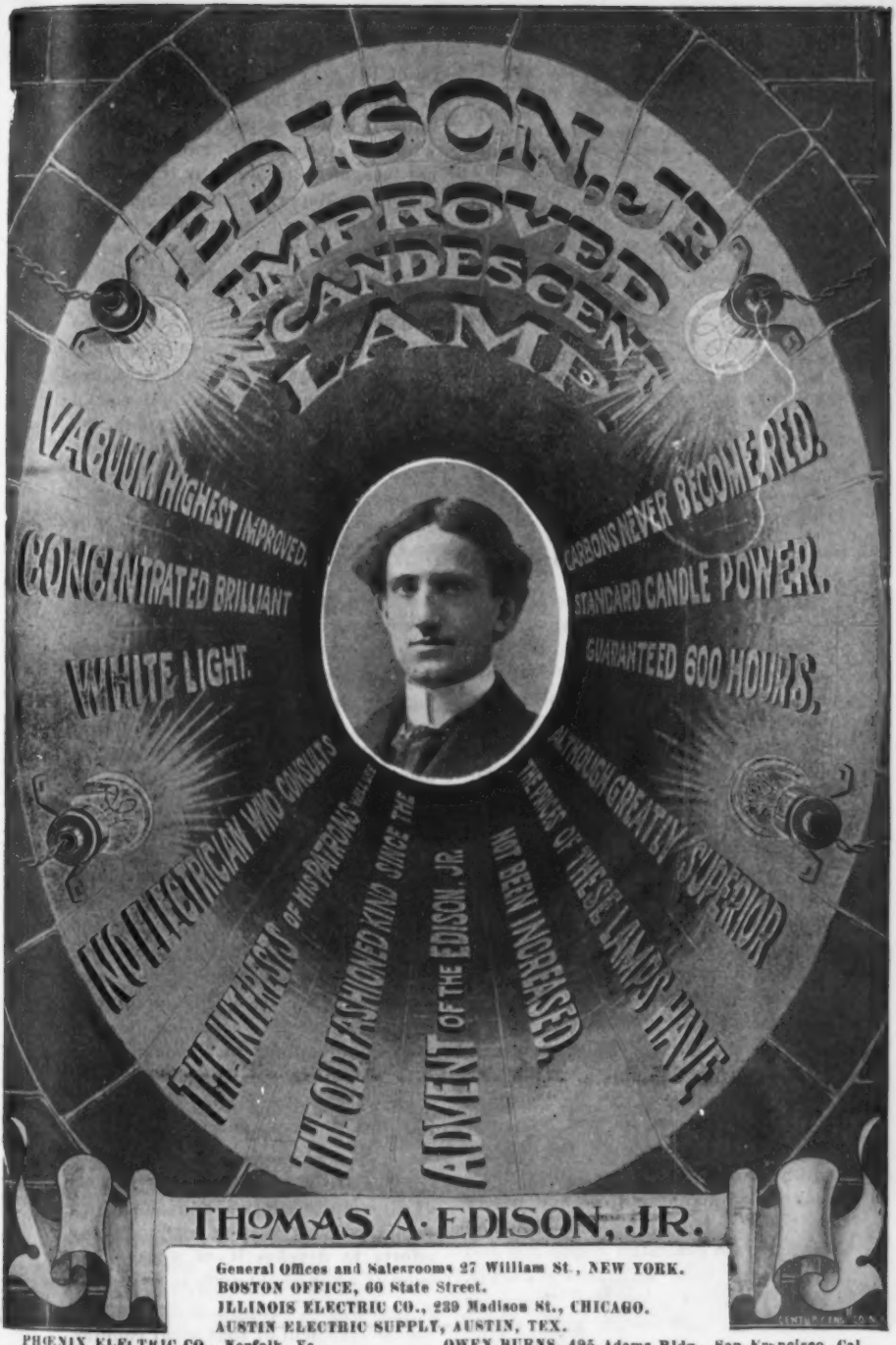
It is simple in construction; perfect in every way; never gets out of order. **No hot fires in summer. Will not explode.** Enjoy the comforts of a cool home on ironing days by using this Iron.

Cost of burning Wood Alcohol, 2c. per hour.

All parts of these Irons are interchangeable, and they may be used either with Gas or Wood Alcohol. **Made in all sizes, for all purposes. These Irons are specially adopted to the woolen trade.** Manufactured and sold throughout the world by

THE EDWARDS SAD IRON CO.,

Sole Owners, **1420 CHESTNUT ST., PHILADELPHIA.**
12 COLUMBIA ST., BOSTON.



General Offices and Salesrooms 27 William St., NEW YORK.
BOSTON OFFICE, 60 State Street.
ILLINOIS ELECTRIC CO., 239 Madison St., CHICAGO.
AUSTIN ELECTRIC SUPPLY, AUSTIN, TEX.

PHŒNIX ELECTRIC CO., Norfolk, Va.,
GEO. H. GILL, 60 State St., Boston.
OWEN BURNS, 495 Adams Bldg., San Francisco, Cal.
J. BOYD DEXTER, Annapolis, Md.
WM. GIBBS BAIN, 748 Drexel Bldg., Philadelphia.

(Continued from page 24.)

Textile Fibres, Apparatus for Spinning. 624,132. Richard Todd, Heaton Chapel, and Jesse A. Stott, Manchester, England.

Textile Fibres, Apparatus for Spinning. 624,266. Richard Todd, Heaton Chapel, and Jesse A. Scott, Manchester, England.

Warping Machine. 624,541. Alonzo E. Rhoades, Hopedale, Mass., assignor to the Draper Company, same place and Portland, Me.

Warp Stop Motion for Looms. 623,732. James H. Northrop, Hopedale, Mass., assignor to the Draper Company, same place and Portland, Me.

Weft Fork Mechanism for Looms. 624,765. Willie G. Eaton, Nashua, N. H., assignor to the Draper Company, Portland, Me., and Hopedale, Mass.

Winding Machine. 625,305. Patrick H. Curley, No. Andover, Mass., assignor of three-fourths to John F. Finn, William E. Ryan, and John F. Roberts, Lawrence, Mass.

Air Moistening for Factories.

AN IMPORTANT CONSOLIDATION OF BUSINESS INTERESTS.

The two representative air moistening companies of this country,—the American Drosophore Company and the Aerophor Company, Boston, Mass.,—have recently consolidated their business interests under the name of the American Moistening Company, with offices in the Equitable Building, 150 Devonshire Street, Boston, Mass., under the direction of the following officers: William Firth, president; Frederick Grinnell, vice-president; Frank B. Comins, treasurer. The financial standing of these companies was always good, and is strengthened by this consolidation. The same parties that were interested in the two separate companies will be identified with the new one, as will be recognized by the names of the officers given above, which is a sufficient assurance to manufacturers and others that their business will be conducted in a way to command confidence and secure the most satisfactory results. Both President Firth and Treasurer Comins are well known in the manufacturing community, and the fact of their remaining in the new company is a strong guarantee that the installations of the moistening system will be of the very best. Of the principle of humidifying the air in our textile mills, it is well stated by one familiar with the system that "too much cannot be said in its favor, as it is one of the most important inventions that has been made in manufacturing for some years, and its general adoption is sure to follow. When we come to consider that it increases the production as well as making the atmosphere in the different departments suitable to the comfort of the operative, we can see no reason why any mill should be without it." A trip through the mills of the South would convince one more than ever of the usefulness of this system, as in some places where extreme heat exists, and where, if it was not for humidifiers, the heat in the mill would be almost unbearable, the air in the rooms where the system is working is made just at a comfortable temperature, and the work is made to run beautifully. In the weaving and spinning mills in New England the humidifier is considered almost indispensable and is in general use, although the installations in use here for doing the work are in most cases not nearly such complete working machines as those in use in the South. With the fine facilities which this new company will have for building and installing these machines, and the patents and expert knowledge which the management of the company possesses, textile manufacturers may feel that this consolidation is a distinct advantage to them and that they obtain the best system for doing their work well according to the peculiar circumstances of each case.

—One of the most neglected portions of Russian territories, and one which would perhaps best of all repay any efforts to develop it, is Siberia. In spite of what would seem to be difficulties absolutely thrown in the way of the development of that great country, progress to a notable extent has been made, and this at last has forced itself upon the attention of the rulers of Russia.

Lowell Textile School.

GRADUATING EXERCISES.

The first class to be graduated by the Lowell Textile School, Lowell, Mass., received dimplomas on Friday evening last. The class consisted of one woman, Miss Katharine Burrage, who received a special certificate for art and design; and six men of the day course, J. W. Bailey, C. F. Harmon and A. A. Smith, of the cotton course, had for their thesis "The Investigation of Evenness of Product in Picking, Carding and Drawing." A B. Fels and E. T. Tilton, of the wool course, had for their thesis the "Comparison of Theory and Practice in the Production of 2/36s Worsted Yarn from the Top." James H. Cuttle, of the wool course, had for his thesis the "Discussion of Methods of Cloth Analysis."

From the evening school there were graduated 18 men, as follows:

Woolen and Worsted Spinning—Heaton Binns, H. H. Crompton, I. Kellett, I. D. Majerison, T. A. Nugent, W. H. Stopherd, W. H. Stevenson. Cotton Spinning—James T. Broadbent. Design—F. M. Berry, A. C. Gaunt, A. L. Moir. E. H. Spedding, W. Wilmot, G. H. Wilton, John Collier. Weaving—J. T. Noble, W. H. Stopherd, E. S. Swift, T. A. Nugent, J. W. McAlister. It will be noticed that three men, viz., Heaton Binns, T. A. Nugent and W. H. Stopherd, completed two courses each.

The exercises consisted of addresses by President Cumnock, Thomas Walsh, Supt. Hamilton Print Works, His Honor, Mayor Crowley, J. L. Chalifoux, Agt. E. W. Thomas of the Tremont & Suffolk Mills, Principal Crosby, Sec. J. T. Smith of the corporation and A. B. Fels, who responded for the graduating class.

Music was furnished by the American orchestra. There was an exhibition of the work of the school, which was largely attended, lasting through Friday and Saturday. The character of the work was noticeably very much for the better, and the increase in the number of pieces of fine work shown was very creditable.

Novelty Yarns.

Within the last few years, the work of the designer has been very much facilitated by the materials at his disposal. Although fancy and novelty yarns date back many years, the variety was small and they were made in a crude way, and without the science and skill which has in recent years been brought to bear by the few concerns who have given it especial attention.

Instead of having to depend so much on his design and combination of weaves for effect, the designer can now obtain striking effects in a very simple way, by employing novelty yarns, which can be made up as he may desire. The ingenuity of the novelty yarn manufacturer, however, leaves little for the designer to suggest. Indeed, these yarn manufacturers are in a way designers themselves, and their ingenious experiments have evolved a wide range of effects, which are suggestive to the manufacturer. The sample cards of these novelty yarn mills are most interesting examples of the yarn designer's skill, and the manufacturer of fancy goods who neglects the suggestions thus offered to him, is missing one of the opportunities which the progress of textile invention offers.

—Designing for the church, for furniture or upholstery, and for personal decoration have been the three important divisions or uses of pattern work from the earlier times.

—All religious beliefs have always had an outward expression, and it was customary for many centuries, and ought to be so still, to offer to God the best, both of art and of all human effort.

—Printing was introduced into England from Holland by Flemish emigrants, about the close of the 17th century, probably in 1676.

Facts and Gossip.

--*Connecticut, Mansfield Centre. It is expected that the Mansfield Mill, now owned by the American Thread Company, will be kept running until October, instead of shutting down at this time, as was announced last winter.

—Massachusetts, West Boylston. The Clarendon Mills, which plant will eventually be taken by the Metropolitan Water Board, will operate their mill until September 1, and possibly longer. It was thought that they would have to shut down July 1.

—New Jersey, Passaic. Incorporation papers have been taken out by the Peerless Finishing Company, organized to manufacture and prepare for market, all kinds of textile fabrics, with $50,000 capital, 2000 shares of $25 each. The stockholders are: James Watson, Passaic, one share; G. Wallace Watson, Passaic, 143 shares; James B. Tate, Stoughton, Mass., 60 shares. The principal office is at 252 Main Avenue, Passaic, N. J. It is understood that the company will do business in Massachusetts.

—New York, New York. The Manhattan Worsted Mills, 608 West 130th St., New York, will be sold at auction on the premises Thursday, June 8th, at 11 o'clock. The property consists of buildings, machinery, etc. Charles E. Lydecker, 120 Broadway, New York, is in charge.

—New York, Syracuse. The Glenside Woolen Mill Co. has been awarded $23,932.57 damages by reason of the stoppage of the flow of water from the outlet of the Skaneateles Lake. The claim has been under consideration for several years.

—North Carolina, Burlington. The mills owned by W. E. & J. H. Holt, known as the Glencoe Cotton Mills, have been incorporated under the name of the Glencoe Mills. The plant has 3536 spindles and 186 looms, and it is thought that the plant will be enlarged.

—*North Carolina, Concord. The machinery equipment of the Coleman Mfg. Co.'s mill, to be operated by negro labor, which has been struggling to make a start for several years, is now being put in. It is second-hand machinery from a New Hampshire mill. There are 5000 spindles and 150 looms.

—North Carolina, Goldsboro. Henry Weill and others have incorporated the Robbin Manufacturing Co., with a capital stock of $12,000.

—North Carolina, Mountain Island. The Mountain Island Mfg. Co. expects to build a new weave shed to accommodate the seine looms which the company now operates at Baltimore, Md. This will bring all their seine looms together. A new penstock is to be put in.

—Pennsylvania, York. The York Silk Company has been organized here, with L. H. Stoner, president, G. W. Gross, vice-president, Frank Reeser, secretary, Henry Musser, treasurer, and M. B. Collins, superintendent.

—Rhode Island, Westerly. George Singleton, proprietor of the Westerly Silk Mill, will not renew his lease of this mill, but intends enlarging his plant at Dover, N. J. J. W. Conant is manager of the mill.

Stillwater
WOOLEN MILL
AT AUCTION.
Important to Mannfacturers and Capitalists.

Will be sold at public auction on WEDNESDAY, June 21, 1899, at 11 o'clock a. m., on the premises, the Stillwater Woolen Mill, belonging to the estate of Edward Pearce and situated at Stillwater, in Smithfield, Rhode Island, on the Providence and Springfield Railroad, 11 miles from Providence, comprising the following property: About 80 acres of land, including mill pond and flowage rights, estimated water area 16 acres, buildings and machinery of a 10-set woolen mill, the buildings substantially built of brick and hewn stone; water power, the Woonasquatucket river, with 22 feet fall; steam engine, 16 by 48, estimated horse power, 200; large building for village store, tenement and large hall; boarding-house, 32 rooms; large barn; 12 tenement houses, 39 tenements; superintendent's house, well built of stone.

The shipping facilities are the best.

The property will be sold as a whole, and can be examined at any time previous to day of sale. Conditions of sale: 10 per cent. of purchase money to be paid at time of sale; balance on transfer of property.

Train leaves Providence for Stillwater at 9.35 a. m., returning, leaves Stillwater at 1.15 and 5.55 p. m.

For further information apply to Henry L. Dempsey, on the premises, or Henry Pearce, 45 Weybosset street, Providence, R. I., where plan of mill and a plat of the property can be examined. Per order

THE STILLWATER WOOLEN MILL,
Henry Pearce, Treasurer.

—*Rhode Island, Westerly. Dennison Walker, who owns the mill here now being vacated by Campbell, Henault & Co., has made a proposition to Westerly people that if they will raise $10,000 toward the stock of a company, Mr. Walker will go there and operate the plant. As yet no action has been taken by Westerly people. Campbell, Henault & Co. inform us that they have not yet decided where they will locate.

—Rhode Island, Westerly. We note a report that the Westerly Woolen Co. has purchased the carding machinery in the brick mill formerly leased by the firm of Campbell, Henault & Co.

—Rhode Island, Woonsocket. Simson & Kirkaldy, worsted manufacturers, will increase the wages of their weavers at the rate of 1 cent per yard.

—South Carolina, Abbeville. The Abbeville Cotton Mill, which we recently reported had placed a contract for their new building, has now decided to put a temporary roof on the addition, and put in Draper looms, so that they can fill a large order immediately.

MITCHELL-BISSELL CO.,

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A REPRESENTATIVE amongst the mills in the North, for a side line of good merit. Money in it for right man. Must push the article. Address:

W. & S. 38, care of Textile World.

MAY COPIES WANTED.

The May ('99) edition of the Textile World is entirely exhausted, and having many unfilled orders we should like to buy back copies in good condition, and will pay 20 cents each for same. In sending in, subscribers will please indicate whether they wish to receive cash or to have their subscription extended a month. Mark plainly on the wrapper the sender's name, so proper credit may be given.

TEXTILE WORLD,
620 Atlantic Ave., Boston, Mass

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I will pay $1.50 for a file of the TEXTILE WORLD in good condition from December, 1898, to May, 1899, both inclusive. Address postal before sending to H. A. W., care of New England Thread Co., Pawtucket, R. I.

LOOM FIXER.

An especially good loom fixer is open for a position. Philadelphia or New England States preferred. Wants $2 25 and upwards. Aged 34; married. Familiar with Knowles fancy looms up to 3⁸ harness; all makes of English looms and Crompton dress goods looms. Can take position at once. Address 1508, Textile World.

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SOLE AGENTS FOR

J. B. Farrar & Sons, Halifax, England,

Buggella Cork Rollers for Spinning and Drawing.

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SPANISH, FRENCH, GERMAN.

I am prepared to undertake translation from the above languages into English or from English into Spanish, French or German. I translate circulars, prepare catalogues and other commercial literature for circularizing in foreign countries and can translate necessary correspondence. I have given especial attention to commercial Spanish as employed in Mexico and South American States. Work is done expeditiously and my charges are very reasonable. I refer, by permission, to the publishers of the TEXTILE WORLD.

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Foreman of Silk Weaving.

Age 30; unmarried. Graduate of the weaving school of Vienna, and employed for a number of years in the silk mills of Austria. Has been five years in this country and speaks English very well. Is familiar with weaving neckwear silk, dress goods and handkerchiefs, also suspender and elastic webbing. He is also a designer. Expects $3 per day to start. If interested, address, "R. S.," care of Textile World's Employment Bureau, 620 Atlantic Ave.

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A new plant, capacity 100 dozen per day.

Water Power To Let, 400 H. P., with excellent buildings.

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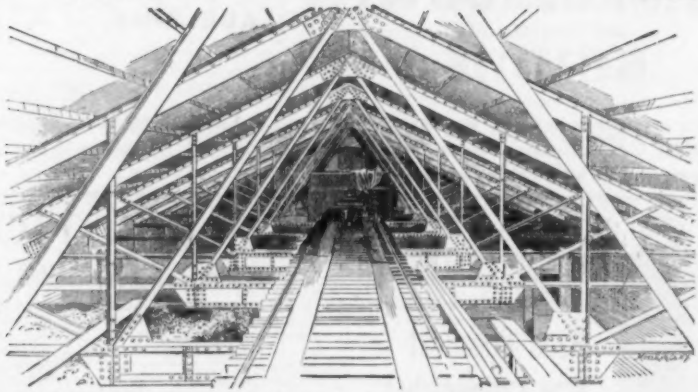
GIBSON'S RECIPES.

Mrs. Gibson has consigned to us for sale all the original books of recipes with samples attached prepared and used by Richard Gibson, covering the entire period of his long career in the dyehouse as one of the foremost American dyers. Some of the recipes are doubtless very valuable. There are several large books and a number of smaller ones, papers, memorands, etc. Mrs. Gibson thinks she ought to get $100 for the lot. We think so too. The sample books, etc. may be examined at our office by interested parties. The entire amount goes to Mrs. Gibson. She informs us that there are no more copies of her husband's printed books to be had.

TEXTILE WORLD,
620 Atlantic Ave, Boston, Mass.

THE BERLIN IRON BRIDGE CO.

ENGINEERS, ARCHITECTS, AND BUILDERS OF STEEL CONSTRUCTION FOR FACTORY BUILDINGS.



The above illustration is taken direct from a photograph, and shows an Iron Truss Roof, designed and built by us for the Burlington City Water Works, at Burlington, Vt. The building is used for storing coal, and the roof is designed to carry a track through the trusses so that the coal can be distributed from the car, and thus save handling. The roof is entirely of iron, no woodwork being used about it in any way, shape or manner, it being absolutely fire-proof.

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M. V. RICHARDS,
Land and Industrial Agent, Southern Railway,
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run the lines of the Illinois Central Railroad and the Yazoo & Mississippi Valley Railroad, reaching into the eleven States of

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Presenting an unequaled territory for diversified industries, and possessing

Fine Sites for New Mills
Best of Freight Facilities—Coal Fields
Close Proximity to Distributing Centres
Intelligent Help of all Kinds
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To sound industries substantial inducements will be given by many of the places concisely described in the pamphlet "100 Cities and Towns Wanting Industries." Write for a copy. Nearly all kinds of industries are wanted. Very liberal inducements are offered **Textile Industries** in the South by a number of good places. GEORGE C. POWER, Industrial Commissioner I C R. R. Co, Chicago.

SITUATIONS WANTED.

The advertisers in the following columns should be addressed in care of TEXTILE WORLD or inquiries concerning them may be addressed directly to "Information Department TEXTILE WORLD," as full particulars of each advertiser are on file, and the addresses of suitable agents, superintendents and foremen for every branch of the textile industry will be furnished to manufacturers.

Any subscriber may file his application, and no charge is made until position is secured.

The business of this department is held strictly confidential.

The applications of good overseers in every department, who are in want of positions, are solicited.

Manufacturers are invited to use this department when in need of skilled men; each case will be handled confidentially, with promptness and judgment, and without charge to manufacturers.

A member of the firm is in charge of this department, and gives personal attention to each case.

WOOLEN SUPERINTENDENTS.

1546 **Agent or Supt. Woolen Mill.** Age 33; married. 15 years' experience in Scotland and America in woolen trade. Cassimeres, Scotch cheviots and fancies and Irish friezes a specialty, both colors and make up. At present in position, but anxious to have full charge of 8 or 10 set mill. Best references.

935 **Woolen Supt. and Designer.** Graduate of German Textile School. Has managed successfully two mills in the West. Thoroughly up on designing and general mill management. Age 35. Married. References first-class.

1159 **Woolen Superintendent.** A first class man on carriage robes, furniture plush, bed and horse blankets. Has excellent references. Has held present position as superintendent for several years; good reasons for desiring a change. Age 39; married.

1349 **Woolen Supt. or designer.** Has been 12 years superintendent of 20 set mill in Conn., until recently, when he resigned on account of children's schooling. Has also been designer and pattern weaver. High character and first-class ability. Age 39; American, married. Experience on worsteds, cassimeres, cheviots, ladies' fancy dress goods, etc.

1227 **A Superintendent** with a thorough practical training in all the departments of a woolen mill making worsted cassimeres, dress goods, cloakings, overcoatings, robes, blankets, shawls, etc. Has a thorough knowledge of designing and has held position in first class mill, to which he can refer.

1268 **Woolen** superintendent or designer. First-class experience in England and America. A first-class man in every way; age 34; married. Fancy worsteds, cheviots, novelty goods, cassimeres, overcoatings, cloakings, dress goods, piece dyes, worsteds and cheviots.

218 **Woolen Superintendent, Designer** or Boss Weaver. Age 35; American. Has worked on all classes of dress goods and men's wear. Can furnish good references and will accept a moderate salary.

1386 **Woolen Superintendent or** Boss Carder. Age 43; American. Familiar with the manufacture of all kinds of woolen goods, is well recommended, and can go immediately.

1490 **Superintendent** Age 37; German. Has worked on plain and fancy worsteds, cotton worsted, all woolen mixes and mixed cassimeres. 14 years' experience in this country.

COTTON SUPERINTENDENTS.

1539 **Superintendent or Agent.** Age 43; married. Has worked on all classes of linen and cotton goods, plain and fancy. At present manager of a large mill, but can leave at one months notice.

1532 **Superintendent.** Has been in mill business all his life, and been with the present firm for a number of years, having been promoted several times He wishes to better himself.

1306 Young American wants position as cotton superintendent. Experience mostly on cotton warps. Has been bookkeeper, overseer of carding and spinning; also superintendent in Massachusetts mills.

1432 **Desires Position as Superintendent** of cotton mill, or would take overseer of carding in large mill, where good wages can be secured. Age 30; married.

1236 **Supt. of Cotton Mill** desires to change position. Is thoroughly competent, steady and reliable. Good mechanic, manager, push and executive ability. Over 15 years experience, and fully understands how to keep production right as to quantity, quality, and lowest cost. Best system of economy maintained. First-class references can be given.

1464 **Superintendent of Fancy Cotton** Weaving. Age 43; married; an American. Will not work outside Northern and Eastern states. Has worked on fancy goods of all kinds, white and colored cottons, worsteds and silks. Is familiar with all makes of looms and dobby heads. Is at present employed, but wishes to better himself, if possible. Refers to present and past employers.

1453 **Superintendent** desires position in a cotton mill. Age 26; married; American. Has worked on prints, fine sateens, sheeting ginghams, duck, denims, cottonades, ticks, awnings and domets. Is familiar with all makes of spinning, spooling and warping machinery. At present employed, but wishes to obtain a more advanced position. Refers to present and past employers.

1269 **Cotton** superintendent, carder, spinner and dresser; 48; married. Has held position in some of the best mills; is strictly temperate, and well recommended. Cotton, flannels, ginghams, crochet and Marseilles quilts, etc.

1496 **Superintendent or Boss Weaver.** Age 45; single. Large experience on all classes of cotton goods and all makes of American machinery. At present employed, but wishes to obtain a better position. Now in charge of 1800 looms. Is willing to go South.

WOOLEN CARDERS.

1501 **Boss Carder on Woolen or** Knit Goods. Age 29; American. Has worked on percentages and all wool goods. Was 11 years with one firm as second-hand and boss carder.

1529 **Boss Carder or Spinner,** on woolen or knit goods. Scotch; age 48; married. Has worked on flannels, cassimeres and hosiery. Good references.

1358 **Wool Carder,** now employed as second hand in large mill. Highly spoken of by past employers, habits, character and ability A1. Capable of taking charge of a room. Experience on high and low grade stock. Age 27, American, married.

1553 **Woolen Carder and Spinner.** Well recommended by past employers. Most experience on carding, wool, worsted, shoddy. Has also had charge of spinning in addition to the carding. Age 35.

1562 **Overseer, Carding and Spinning** of all grades of woolen yarn. Many years' experience in both departments, and is well spoken of by past employers. Age 38; married. Good machinist. Has set up machinery.

1367 **Boss Carder** of wool, shoddy, or cotton. More than 12 years experience as boss carder in leading knitting mills in N. Y. At present employed but desires to change for $3 00 a day or better. Can take charge of mule spinning also. Married; age 36; American.

COTTON CARDERS.

1403 **Cotton Carder** with 17 years experience in N. E. mills as overseer and second-hand, now in the South but wants to return North. Has never worked for less than $3.00 but would take $2.50 to change. Married. Age 38. Best of references.

1469 **Cotton Carder and Spinner.** Has had charge of both in good mills. Excellent references. Age 37, married.

1339 **Cotton Carder,** young man holding first-class position in New York State, would like position in Eastern or Middle States as assistant superintendent or boss carder paying $5.00 or more a day. Is worth that salary; experience and references of the best.

1535 **Second-Hand Carding, or** Speeder Fixer. Age 41; American. Is a first class man, and thoroughly acquainted with every detail of his work. At present employed, but can leave on very short notice. Prefers to obtain work in New England States

1260 **Young Man** who has worked up through carding rooms of some of the best mills in New England, wants position as overseer in New England or Middle States. Age 27. Not married

1315 **Cotton Carder.** Over 20 years' experience as overseer in first class mills. At present employed. Well up on prints and light and heavy sheetings. Knows American and English cards, and speeders. Best references.

1238 **Second** hand of cotton carding. 37; married. Open for engagement.

1368 **Overseer on Second-Hand Cot-**ton Carding wants a position in small room at $2.50 per day or upwards. Will do his own grinding. Or, would take a first-class second hand job. Last five years in one place. Thoroughly practical and understands all the machinery in the card room. Age 37; married. Good reference. Prefers New England.

WOOLEN SPINNERS.

1461 **Spinner, on Cotton or Wool.** Age 33; married; French. Has worked in one of the best thread works in this country, also in Alsace-Lorraine, on yarns from 70s to 160s. Is familiar with Dobson & Barlow machines and Schlumberger mules.

1493 **Boss Spinner.** Age 25; unmarried; German. Has worked on cassimeres, cheviots, stockinets, satinets and camel hair goods. Can operate American mules, and has worked for several years in American mills, to which he refers.

1503 **Boss Spinner.** Age 38. Has worked on kerseys, meltons, cloakings, dress goods, carpet yarns, etc. Good references.

1543 **Woolen Spinner and Carder.** Has handled both departments together and separately. Will go South or West. Age 29; single.

1545 **Woolen Spinner.** A very reliable man, who has worked up to 2nd hand in a good N. E. mill, wishes to secure a position as overseer.

1519 **Overseer Spinning.** Age 31; American; married. Has worked on yarns from one run to 5⅝. Will accept an average salary. At present employed, but wishes to better himself.

COTTON SPINNERS.

1542 **Cotton Ring Spinner,** now employed as second hand, desires to change to a small mill as overseer. Training with good mill and highly spoken of. Would start at $2.50.

1176 **Cotton Spinner,** also overseer, twisting, spooling, warping. Has been overseer in three good mills. Experience covers most all kinds of machinery. At present employed, but could leave on short notice. Age 40, married. First class references.

1550 **Cotton Spinner.** Boss or second hand. 9 years' experience. Parr, Platt, Asa Lee's mules, Whitin frames. Now employed but wishes to get larger experience. Age 25; single, American.

1438 **Cotton Mule Spinner** who has worked on plain white goods only desires to secure a permanent position in the Eastern or Central states. Has good references and is perfectly reliable. Age 45. Married.

1429 **Cotton Ring Spinner** who has been overseer 5 years and second hand 8 years. Worked on white and colored yarns, spooled and twisted. Refers to past employers in Maine and Mass. Age 36. Married.

1350 **First-Class Ring Spinning** overseer, also spooling, warping, slashing, web drawing; large experience, highest references as to skill, character and executive ability. At present employed in Fall River. Age 48. American.

1158 **Overseer of Ring Spinning,** spooling, warping and slashing wants position on white work, fine or coarse. Age 46; single. Will go anywhere. Good references. Familiar with Mason, Bedford, Lowell and Fales & Jenks machinery.

1370 **Overseer Cotton Ring Spinning** At present second hand in a large Maine mill. 12 years experience in spinning Age 34; not married. High references from past and present employers.

WOOLEN WEAVERS.

1517 **Overseer Woolen Weaving.** Age 37; married. Has had a large experience on all classes of woolens and worsteds. Will go anywhere

1521 **Overseer Weaving,** in woolen or cotton goods. Age 42; American; married. Has worked on all classes of cotton, woolen, worsted and silk goods. Refers to past employers and others.

1506 **Worsted Weaver.** English; age 33; married. At present employed, but wishes to obtain a more lucrative position. Will go anywhere. Experienced on all classes of worsted goods, fancy dress goods, etc.

1482 **Weaver or Wool Sorter.** Has worked on cassimeres, cheviots, tricots, kerseys and cloakings. Good references.

1130 **Overseer of Woolen Weaving** wants position. Would accept 2nd hand's position in a good mill. American; protestant; age 36; single. Good man on Knowles fancy and plain looms, also Davis & Furber. Cassimeres, worsteds, meltons and flannels. Will not go South, West or Pennsylvania.

1547 **Boss Weaver,** with very long and varied experience. Familiar with all makes of machinery. Has been superintendent but would accept overseer job in a first class mill.

1551 **Boss Weaver,** especially up on plush looms, both wire and double. Has worked in almost every department of woolen mill and would take charge of a small plant at moderate salary. Age 42; married. New England experience.

COTTON WEAVERS.

1556 **Cotton Weaver.** Learned fixing in England and has been 16 years in Canada, 8 years overseer of weaving, beaming and warping. Wants to work in the U. S. will accept $3.00. Age 33; married.

1380 **Overseer Cotton Weaving.** Held overseer's position for 5 years in Mass. mill, but now out because of change in management. A man of well-known ability. Age 48; married, American. One of the best weavers in New England. Will go South to a good position.

1334 **Jacquard and Dobby Weaver** and designer on Knowles machines. 8 years' experience in this position. At present employed and can furnish excellent references. Age 33; married.

1333 **Overseer of Cotton Weaving** with more than 20 years' experience in weave rooms of N. E. and Canadian mills. Experience on all kinds of white and colored, plain and fancy work, except Jacquard, American and English, looms. Married; age 37.

1533 **Overseer Weaving or Superintendent.** American; age 38; married. Has had twelve years experience on all grades of white and colored fancy goods. Would like overseers' position in large weaving room, or on carding.

1235 **Cotton** man wants position as overseer of cotton weaving. Prints, twills, satins, denims, cheviots, lenoes, etc. Crompton, Knowles, Lowell, Whiting and English looms.

1373 **Overseer Cotton Weaving.** A man with especially good opportunities to gain wide experience in large Mass. mills; now second hand, having worked up from band boy. American, age 29, married; best of references.

KNITTERS.

1544 **Underwear Knitter.** 10 years' experience on ribbed underwear. Has run silk, worsted, lisle, cotton and mixed yarn. Best references from present employer, with whom has worked four years. Can leave at once.

1549 **Knitting Machine Fixer.** 17 years' experience on almost all kinds of machinery. Now employed; wants to change; would expect $2.25. Age 38; married.

1492 **Boss Knitter.** American; age 25, single. Large experience on ribbed goods. Is acquainted with all makes of knitting machinery. Well recommended.

1554 **Boss Knitter.** Underwear, Jersey ribbed, lisle, wool plaited work, silk. Can handle any latch machine. Good references. Age 26; married.

1435 **Boss Knitter** Underwear, astrakhans, stockinet, rubber linings, etc. Efficient workman on circular spring needle machine. Age 36. Married.

1224 **Boss Knitter.** At present employed, but wants to change. 15 years' experience on ribbed underwear; all kinds of ribbed machines and sewing machines. Strictly temperate. Good references.

1401 **Boss Knitter** at present employed but wants to change. Experience on plush, cotton, and wool. 10 years as second hand previous to present position as overseer. Age 30. Married.

DYERS.

1531 **Boss Dyer.** American; Age 32; unmarried. Has had a large experience on raw stocks, rags, worsteds, yarns, pieces, cassimeres, kerseys and dress goods. Not at present employed. Can take position immediately.

1505 **Boss Dyer** on all classes of wool, woolen and worsted yarns, cotton warps, indigo, etc. Desires to change to better himself.

1476 **Boss Dyer.** Experience on kerseys, broadcloths, dress goods, cassimeres and worsted piece dyes. Has been in good mills for 3, 5 and 7 years and gave satisfaction. Would start in New England or Central States for $3.00 a day.

180 **Woolen Dyer.** Age 42; married. Has had a large experience, and is a good practical man. Used to all classes of goods. Has worked largely on government orders. Good indigo dyer. Refers to former employers and others.

1355 **Wool and worsted Dyer,** a young man with 5 years' training by one the best dyers at one of the largest mills in N. E. Experience on worsted and woolen cheviots, clays, worsteds, suitings, cloakings, beavers, dress goods, carriage cloths, yarn, slubbing, wool. Now boss dyer. Good reasons for desiring a change.

1559 **Boss Dyer,** raw stock, cotton, woolen and worsted yarns and piece dyes. A Scotchman with very thorough training. 18 years in this country. Now employed but will change for good job paying over $3.00. Age 32.

1561 **Boss Dyer,** with long experience on all kinds of worsted, serges, cloakings, flannels, repellants, kerseys, also all wool, cotton and silk. Best of references. Age 35; married.

DESIGNERS.

1383 **English Woolen Designer.** 20 years in leading Yorkshire and Huddersfield mills as designer, supt. and weaver. Very large experience and would accept moderate salary in good mill. Age 36; married, English.

1444 **Designer.** Has made a special study of designing during the past ten years. Wants a position which offers chance for advancement. Has worked on all classes of goods and is familiar with standard makes of machinery. Can fix, set up and has started sections of new fancy looms.

1431 **Woolen Designer or Superintendent.** Young man, at present employed, desires to secure a position as above. Has been assistant superintendent of 18 set mill making fancy cassimeres and worsteds. Single. References show him to be a man of good ability.

1449 **Overseer of Weaving or Designer.** Age 38; married; American. Thoroughly capable. Has designed his own goods for eight years, and studied designing for two years. Left last position on account of sickness, and will take a small salary to start. Has worked on all classes of cottons, plain and fancy, and is acquainted with all makes of machinery. Refers to former employers and others.

1509 **Designer, or Boss Dresser,** or will take superintendency of small mill. Age 38; married. Has worked on dress goods, fancy worsteds, cloakings and piece dyes. At present employed as boss carder, but desires to better himself, if possible.

FINISHERS.

1526 **Foreman of Finishing Room,** Folding, Packing, etc. Age 45; married; English. Has worked on white and colored goods and prints. Is acquainted with every kind of machinery used in his business. Has worked 11 years in this country. Can give good references.

1534 **Overseer or Second-hand** Woolen Finishing. Age 26, unmarried. Has worked on fancy and piece dyes, broad-cloths, coverts, cassimeres, etc. At present employed, but wishes to better himself. Good references.

1494 **Finisher on Felts,** or will take a position for the making of sizing. Age 26; single. His last position was engineer and in charge of sizing and finishing all classes of felts. Good references.

1499 **Overseer of Finishing.** Age 43; American. Has worked on flannels, cheviots, cassimeres, fine suitings, broadcloth, hair lines, etc; from loom to case. Was 14 years with his last firm to whom he refers.

1489 **Boss Finisher, Second-Hand** or Boss Shearer. Well experienced; excellent references. English; age 27; single.

1396 **Wool Finisher.** This man has had a very large experience among well-known mills and refers to past employers. Character and ability of the first order.

1351 **Woolen and Worsted Finisher** with 7 years' experience as overseer in R. I. and N. Y. mills, from which he has excellent references. At present second hand in one of the best worsted mills in N. E. Habits first-class; age 29, married

MISCELLANEOUS.

1557 **Bleacher,** overseer or second hand. Well recommended, good training, reliable. Wants $2.50. Age 27; married.

1558 **Supt. of Bleaching,** dyeing and finishing, of all classes of cotton piece goods, plain and figured, desires a position. Has had over 20 years' experience in managing help, and has a thorough knowledge of the business in all its branches. Can furnish excellent references from present and past employers.

1555 **Silk Superintendent.** Experience in all departments of a large and successful mill; serges, sateens, linings. Young man but well qualified to take charge or to act as assistant superintendent. Knowledge of office work and prices as well as machinery.

1552 **Overseer Beaming & Slashing,** at present employed but would like to change for good boss job. First class experience and good references, age 32.

1560 **Overseer Twisting and Reeling** who has worked 20 years in the same mill, 10 years as overseer, has resigned on account of new supt. Refers to proprietors and former supt. Age 38; married. Experience on threads and twines.

1538 **Master Mechanic.** Age 41; married; American. Is acquainted with all makes of looms, cards, pickers, frames, etc. At present employed, but wishes to better himself. Refers to present and former employers.

1530 **Boss Dresser.** Age 28; married; English. Has worked on dress goods, fancy worsteds, suitings, cassimeres, etc. Is at present employed, but wishes to obtain a steadier position. Good References.

1518 **Overseer Weaving.** Has worked on colored cotton goods, shirtings, dress goods, duck, heavy sheetings, etc. Age 46; married; American. At present employed. Wishes to better himself. Can leave on two weeks' notice.

1528 **Overseer Dressing Room.** Age 38; married; Scotch. Has worked on all classes of goods, from coarse druggets to the finest grade of fancy worsteds. Is acquainted with all forms of looms used in dressing. At present employed, but wishes to change his position. Will go anywhere.

1515 **Pay-Master and Shipping** Clerk. Will only work in Southern States. Will accept a moderate salary to begin.

1514 **Overseer Twisting, Spooling,** Winding and Reeling. Age 39; married; American. Has been in one position for 17 years. Wishes to better himself. Will go anywhere.

1520 **Overseer on Prints, Sheetings** and Shirtings. Age 32; married. Wishes to obtain a position in the New England States.

1516 **Warper, or in Charge of Spooling.** Age 44; married. Experienced on flannels, blankets, dress goods, cassimeres and carriage cloths. At present out of a position, and will go anywhere.

1418 **Cloth Hall.** Overseer, shipping clerk or paymaster. Has had a thorough experience in each of the above positions and is familiar with white and colored cotton goods. Is well recommended. Aged 35. Married, and is also a good all around accountant.

1492 **Boss Knitter,** Spring needles. Now holding a position in New York. A No. 1 on fleeces, both single, double, and cut pressers. Understands running and setting in all gauges from 12 to 32. Working at present on 26 and 30. Understands all makes of latch needles for underwear.

The Perfection Ventilator.

The accompanying illustrations show the new ventilator which has been recently patented and is now being put on the market by Berger Bros. Co., 237 Arch St., Philadelphia. This ventilator is radically different from

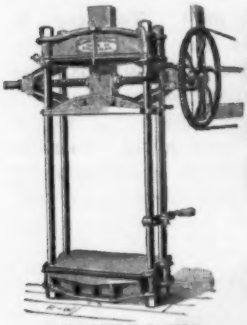
others on the market, and while built on scientific principles, is yet so simple that it seems to have reached the limit in this direction, and its graceful curves are attractive in design and appearance. Its efficiency is of the highest order, and while being free and open from all obstruction

INTERIOR VIEW.

that would interfere with perfect draft and collect deposits of soot and dirt, it is still absolutely storm proof. The body is of sheet iron, formed in such a way as to secure an inward and outward flare. The cap is fastened to the body with malleable iron stays. The galvanizing is done after the ventilator is made, excepting in the larger sizes. This insures freedom from rusty joints. There is no solder used in the construction of the ventilator, and, therefore, no danger of its collapsing under heat. The manufacturers have given it careful study and believe they have perfected a ventilator which exhausts a large amount of air, allows an easy discharge and affords no opportunity for the accumulation of dirt and at the same time its simplicity is such that it can be sold at a price which is attractive. The stock article is of galvanized iron, but they are prepared to furnish them in copper or bronze to suit any special requirements. The firm is a well-known and responsible house, and their statements can be accepted with confidence.

—At Pondicherry, one of the scraps of territory still held by France in India, there are three steam cotton spinning and weaving mills worked by companies.

—Among the early acts of the Japanese Department of Education, which was established in 1871, was the publication on August 2, 1872, of new Educational Laws.



KNUCKLE JOINT.

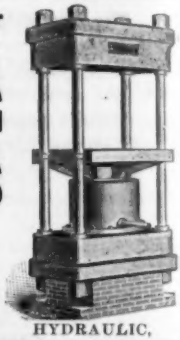
BOOMER & BOSCHERT

BALING PRESSES

ARE THE STANDARD.

Boomer & Boschert Press Co.

338 West Water St., SYRACUSE, N. Y.



HYDRAULIC.

TRADE MARK.

Chas. B. Cook, *Pres.* Arthur H. Mason, *Treas*

Capital Stock, $500,000.

SANFORD SPINNING CO.

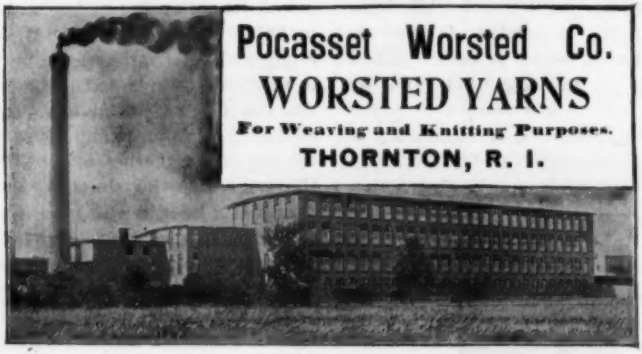
Fall River, Mass.

32,000 Spindles. Weekly product, 65,000 pounds 6s to 30s.

Colored Cotton Yarn

From American Peelers and Egyptian Cottons.

Solids, Mixtures, Bleached, Combed and Carded Egyptians. Cops and Cones.



Pocasset Worsted Co.

WORSTED YARNS

For Weaving and Knitting Purposes.

THORNTON, R. I.

Knitting and Weaving Yarns

Cones, Cops, Warps, Skeins,
Single, Double, Three-ply, etc.
Peeler, Egyptian, Mixed Colors.
Large Assortment.

EDWARD S. HYDE, 223 and 225 Chestnut Street, **Philadelphia, Pa.**

YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn: Spinners are securing a fair amount of orders although there is a falling off for fleece-lined garments, on account of cancellations. The ribbed mills are running full on light weight garments and expect a late season. The hosiery knitters are busy with orders and are ordering considerable yarn. These knitters are having a good demand for novelties, the latest of which is a half-hose with cotton lisle tops and linen feet. There are many German flat knitting machines being set up and are well employed. The principal topic of interest is the yarn combination. The thread trust has taken all of the fine yarn mills into its fold, and have refused to allow the commission men to handle the accounts. The buyers of yarn do not take kindly to the new order of affairs as they fear an extensive advance. It is the tail end of their season at this time, and they anticipate no trouble until the next light weight season although the trust assures them that no advance is contemplated at this time.

The Fall River, New Bedford and Taunton mills are about to be absorbed by a combination. Whether it is the thread trust or a new trust no one can find out at the present writing, but many believe it is the former. These mills manufacture cop yarn largely, which is in competition with Southern yarn. It is a question whether an advance in cop yarn can be effected by this combination. It is the combed yarn end of the question which will be affected, as combed yarn sold five or six years ago from five to ten cents per pound more than at the present time.

Speaking of Southern mills, these mills have made considerable money during the last two or three years. They have been earning from 25 to 50 per cent. on their capital stock. If these mills start in combing yarn, the trust will find a sharp and dangerous competitor. Naturally the knitters of New York State are interested in the working of the yarn combine. A prominent manufacturer told the writer that he was not particularly afraid of the combination, because it would be run by business men, and under such management it would be impossible for a small manufacturer to buy a case of yarn as cheaply as a large user could buy 100,000 pounds. He said a business management would recognize the right of a man willing to risk his money to a lower price than a man buying a small amount. He added, if the spinners did form a trust, those actually managing them would be engaged by the trust to run the mills for at least five years, and as soon as the deal was consummated he would not bother himself about trusts as he intended to build a spinning plant of his own, and would have a surplus to sell outside, and by the old management of the mills being tied to a five years' contract he would not be bothered by competitors of new mills starting up. The knitters in New York State are very busy and have placed many orders for heavy weight yarns for future delivery.

Worsted Yarn: Spinners are securing some orders but are not pushing for business on account of not knowing whether an agreement is to be reached on the worsted yarn trust. All of the worsted spinners have given options to the promoters of the trust, and whether they are accepted or not remains for the promoters to say. The worsted yarn salesmen are all on the anxious seat because if a combination

(Continued on page 151.)

Frank E. Patterson, Prest. Oscar W. Wood, Treas

GERMANTOWN SPINNING COMPANY INCORPORATED GERMANTOWN JAN. 9TH 1890

Germantown Spinning Co.

COTTON CARDED

HOSIERY YARNS

In numbers from 6s to 26s.

Germantown, Philadelphia.

W. Warren Thread Works,

SPOOL COTTON

on 100 to 12,000 yd. Spools or Tubes.

A Specialty of Thread for Manufacturers Use

on Spools, Tubes or Bobbins.

Also Seaming and Hosiery Yarns

on Cones, Tubes or Skein.

Our bleaching and dyeing facilities are new and unsurpassed for prompt and neat work. Correspondence solicited.

WESTFIELD, MASS.

The Best is the Cheapest.

It is BETTER and CHEAPER to wind yarn by the "Universal" system before shipment from the mill, thus insuring perfect delivery to knitting machines without rewinding.

UNIVERSAL WINDING CO.,

F. H. BISHOP, Manager.

226 Devonshire St., - Boston, Mass.

(Continued from page 149.)

is effected many of them will lose their situations. From the present outlook there is a strong probability of the trust succeeding. The worsted spinner-weaver trust is helping the independent mills at present, because the trust has not yet started and the commission houses are getting in their work swinging their old customers to their new mills. Fancy worsteds are selling well, and weavers have orders many of them to last until Sept. 1st. The markets are bare of goods of all kinds and when the duplicate season arrives the mills will be unable to handle the business. The buyers do not yet realize the situation, but when they want more cloth the facts, as stated, will dawn upon them. The trade is buying fine, smooth cloth made from 2/30s and 2/32s, either half-blood or Australian wool, and is buying cloth free from cotton. The cotton-worsted craze is playing out. Many of the weaving mills are running until 9 o'clock at night. Manufacturers expect much trouble from labor during the coming season. Weavers are inclined to contract for yarn for future delivery. Spinners will not make prices further ahead, than July 1st. The weavers, or many of them, have yarn which they purchased during the anti-tariff period, but it is safe to say this yarn is fast running out, and within the next six months many mills, which have not purchased yarn for two or three years, will be in the market. Some weavers are waiting until after July 1st before placing orders. It really looks as though we were to have a prosperous period for the next two or three years.

Of course there is more or less interest regarding the new worsted weaver-spinner trust. The writer talked the other day with one of the organizers. The headquarters have more work than can be well attended to, and the business is increasing to such an extent that it is almost impossible to get office accommodation. The mills purchased by the trust are

(Continued on page 153.)

CATLIN & CO.,
YARNS.
67 Chauncy St., Boston
216 Church St., New York.
206 Chestnut St., Philadelphia.

Walcott & Campbell Spinning Co,
IROQUOIS MILLS.
FANCY HOSIERY YARNS
IN ALL COLORS.
New York Mills, Oneida Co., N. Y.

JAMES E. MITCHELL & CO.,
Commission Merchants.
122 & 124 Chestnut St., Philadelphia, Pa.
6 & 8 Summer St., Boston.
Cotton, Woolen & Worsted Yarns.
All numbers on Hand and Made to Order.

COTTON WARPS
White or Colored.
Toweling and Grain Bags.
Dana Warp Mill,
WESTBROOK, MAINE.

TUCKER & COOK MFG. CO
MANUFACTURERS OF
WHITE AND COLORED COTTON **WARPS**
Nos. 6s to 30s,
On Beams, Jack Spools or in Chain
CONWAY, MASS.

GRANT YARN CO.,
COMBED AND CARDED COTTON
YARNS 40s and above. AND
FITCHBURG, MASS. **WARPS**

E. JENCKES MFG. CO.
Colored Cotton, Hosiery, Woolen and Merino **YARNS**
PAWTUCKET, R. I.

LINEN YARN IMPORTER.
Hughes Fawcett, 115 Franklin St., New York,
Flax, Hemp & Jute Line and Tow Yarns,
FOR WEAVING PURPOSES
Linen Jacquard Harness Twines.
Fine Cotton Harness and Heddle Twines.
For Cotton, Silk, Woolen and Carpet manufacturers. Correspondence solicited. Samples promptly furnished.

CAPACITY, 50,000 Spindles.

ORSWELL MILLS

FITCHBURG MASS.

COMBED OR CARDED

COTTON YARNS

In Chains and Skeins, on Balls, Beams, Spools—single or twisted.

The J. R. MONTGOMERY CO.,

WINDSOR LOCKS, CONN.

Manufacturers of

Mercerized Cotton Yarns. GIVES THE HIGH SILK-LIKE LUSTRE IN KNIT GOODS AND WOVEN FABRICS

Novelty Yarns. BOUCLE, BOURETTE AND SPIRALS, IN COTTON, WOOL, WORSTED, MOHAIR AND SILK,

Cotton Warps. ON BEAMS, JACK SPOOLS AND TUBES. IN FANCY TWIST, COLORS AND PRINTED.

YARNS

SOLIS : : BOSTON.

179 Devonshire Street.

ANDREW J. SOLIS, Jr. & CO.

Cotton Warps.

WHITTIER COTTON MILLS,
LOWELL, MASS.

INDIAN ORCHARD COMPANY,

Indian Orchard, Mass.

Manufacturers of - - - -

COTTON WARPS AND YARNS
In gray and all colors, single or in any twist.

COLORED COTTON
Machined, Carded or in Roving.

NOVELTY YARNS
In Cotton, Mercerized Cotton, Silk and Worsted, in various Patterns, Colors and Twists.
We are always pleased to assist our patrons of the Woolen Goods manufacture in special pattern warps for samples.
We use a uniform grade of long stapled cotton in all our manufacture.

Continued from page 151.

turning over their business each day. The managers of the trust are appraising the new property and taking account of stock. The trust realizes that there is an immense amount of work to be done before it can get into order. They feel, however, that with the best brains in the country working harmoniously together that a successful outcome for the stockholders will be the result.

There is a great deal of discussion as to how the new trust will handle credits, and how much credit it will give customers. It is pointed out that a concern with $40,000 can get credit to the extent of $8000 from any one house, and in the aggregate get trusted beyond its actual capital. This would be a fair risk for any of a number of houses, but will the trust take on this extra risk? Besides this, is the clothier going to be willing to buy all his cloth from one concern? He, without doubt, will not do this, never mind what the price may be. It is believed that so long as staple plain cloth is made the trust will get along, but when it comes to making fancy worsteds the best talent is not now in the trust. One manufacturer who has not gone into the trust, told the writer that his share of the profit in his mill last year was $50,000. He said why should I sell out a paying business, and accept a salary of $3000 per year for five years, and run the mill for some one else. Again, it is recalled that large systems of mills are generally not paying investments. The Sprague experience is recalled as one example of such an undertaking; and Sprague was certainly on a solid basis, which is not the case of the present combine. Spinners of French spun yarn continue busy on orders taken earlier in the season. The price of this yarn is so low today that knitters can use it to better advantage than woolen yarn, and in many instances knitters are using this class of yarn in preference to woolen yarn.

(Continued on page 155.)

WOOLEN AND MERINO
YARNS. Special line for Bicycle and Golf Goods in all shades
For Hosiery, Gloves, Underwear, and all kinds Knit Goods. Cop, Cone and Skeins.
The J. & H. Clasgens Co.
New Richmond, O.

WOOLEN YARNS.
All grades Woolen, Mixed and Merino yarns.
15 SETS CARDS.
EDWARD M. ROCKWELL,
LEOMINSTER. - MASS.

A. HERBST. J. W. JONES.
HERBST & JONES,
KENNEBEC WORSTED MILLS.
Successors to Kershaw Worsted Co.
WORSTED YARN SPINNERS,
21st & Naudain Streets,
PHILADELPHIA.

ALBERT R. ELSASSER,
Clifton Worsted Mills.
WORSTED YARNS.
Lustre Worsted a Specialty.
Mills: Addingham, Del. Co., Pa.

C. MOORE & CO.,
MANUFACTURERS OF
TWINES, THREADS AND YARNS.
Jacquard Harness Twines of all kinds on hand and made to order.
S.W. COR. FIFTH & MARKET STS.,
Philadelphia.

EICHMANN & STERNBERG
530 Broadway cor. Spring St., NEW YORK.
Plain and Gassed Cotton Yarns,
HOSIERY COTTON YARNS,
Mercerized Cotton Yarns. Harness Twines.

Cohannet Mills,
TAUNTON, MASS.
Spinners of High Grade
HOSIERY YARNS OF EVERY DESCRIPTION.
Selling Agents JAMES E. MITCHELL & CO., Philadelphia and Boston.

DANIEL S. PRATT,
180 Summer Street, - BOSTON,
ROOM 24.
851 Calle Piedad, Buenos Aires.
SOUTH AMERICAN WOOLS,
..Personally Selected..
Graded to the Standard of U. S. Markets.

HADLEY
SPOOL COTTON AND FINE YARNS
COMPANY
COTTON SPINNERS.
MILLS AT HOLYOKE, MASS.

SPINNERS OF
FINE COTTON YARNS
30s TO 100s.
Gray, Bleached, or Colored. On cop, in skein on spools, cones or tubes.
Fine Cotton Warps, single and two-ply, in chain, etc.
Spool Cotton and Seaming Thread.
95 Milk St., BOSTON.

THE WILLIAM CLARK COMPANY,
WESTERLY, R. I.
Mills equipped with the latest and most improved machinery.
Combed Egyptian from No. 20s to 100s. Combed Sea Island from No. 40s to 200s.
Also 2, 3, 4, 5 ply and 6, 9 and 12 ply cable laid.
Hosiery Yarns on Cops Tubes or in Skeins, Grey, Bleached or Dyed. (Fast Colors.

MONUMENT MILLS,
Manufacturers of
White, Colored, Fancy and Double and Twist,
COTTON WARPS
HOUSATONIC, MASS. 4s to 60s.

GREENE & DANIELS MFG. CO.,
COMBED, CARDED AND GASSED
Yarns, Threads, Twines and Chain Warps,
Colored and Bleached Yarns Furnished in any manner desired by the trade. PAWTUCKET, R.I.

Established 1849.
CARRIAGE CLOTHS.
LIVERY CLOTHS.
ACCOUNTS SOLICITED.
Broad Cloths, Sackings, Cotton Warps, Whip Cords.
C. Coles Dusenbury & Son,
396 & 398 Broadway, N. Y. City.

HAYES, O. H. & CO.
Representative Lines of Woolens
O. H. HAYES & CO.
Liberal arrangements made with manufacturers or men controlling mills' productions.

(Continued from page 153.)

The knitters using this yarn, both in underwear and hosiery, are fairly prosperous. They are not using such fine yarn this year as last, as buyers are willing to take a yarn not so fine in order to get lower prices. The price on all yarns is firmer and spinners in some instances are getting two to three cents per pound advance.

Woolen Yarn: Spinners are fairly busy both on weaving and hosiery-yarn. The weaving yarn department is calling for much yarn. We know of at least one weaver who cannot get enough machinery to supply his requirements. French flannels continue to sell well and much yarn is being purchased by the weavers. Hosiery manufacturers are buying considerable merino yarn, 50 per cent. wool and 50 per cent. Peruvian cotton, and many have placed orders for woolen yarn, taking advantage of the low price of wool. It is believed that wool has reached bottom, and is now on the advancing side of the scale. Manufacturers appreciate this fact, and in a quiet way are covering themselves for requirements in the future. Orders are being placed for 2-ply yarn at a price. The users of this class of yarn complain that buyers are backward in placing orders. They are waiting until the last moment, and then will want their goods at once.

Philadelphia Yarn Market.

The volume of trade the past month, has been fair, but in some instances, the supply of yarn seems to have rather exceeded the demand. We have not heard, however, of any large stocks having accumulated. Yarn has generally been used as ordered, but prices must be recorded as rather soft.

There has been a decline in warps and in some of the poorer qualities of knitting yarns, but good quality Southern knitting yarns have held their own.

Worsted and woolen spinners are rather more busy, and fairly well sold ahead for the present.

Merino yarns are in better demand.

We quote:

Cotton warps:

20/1	12¼
22s	12½
26s	13
12/2	12 to 12¼
14/2	12¼ to 12½
16/2	12½ to 12¾
20/2	13 to 13¼
30/2	15 to 15½
40/2	21 to 22

Continued on page 157.)

FRENCH AND BRADFORD SYSTEMS
B. F. BOYER & CO.,
WORSTED YARNS
IN WHITE AND MIXES.
Woolen and Merino Yarns
OFFICE AND MILL
Delaware and Cooper Sts.
Camden. N. J.

Eddy & Street,
COTTON, YARNS WORSTED,
WOOLEN, AND SPUN SILK.
BRAIDS
PROVIDENCE, R. I.

WAVERLY WORSTED CO.
SPINNERS OF
WORSTED YARNS
FOR WEAVING AND KNITTING.
Main St. & Green Lane, Manayunk. Philadelphia.

WE BUY FOR CASH!
ODD LOTS OF
YARNS AND WARPS
ENOS CROSLAND'S SONS,
Haverford Ave. and 69th St., PHILA., PA.

RICHARD CAMPION,
Selling Agent for—
Bristol Worsted Mills,
Highland Worsted Mills.
17 Bank Street, Philadelphia, Pa.

HOWLAND CROFT, SONS & CO.

LINDEN WORSTED MILLS.

Fine Worsted Yarns

OFFICE AND MILLS:

Broadway and Jefferson Ave., Camden, N. J.

Represented by FIRTH BROADHEAD,
937 Banigan Building, Providence, R. I.

ALLEGHENY WORSTED MILLS,

Thomas Wolstenholme, Sons & Co., MANFRS. OF

ALL NUMBERS SINGLE AND TWO-PLY,

Worsted YARNS,

Sell Direct,

on Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural & Fancy Mixes

Office and Mills: Frankford Ave. and Westmoreland St., Phila., Pa.

CRANSTON WORSTED MILLS.

Worsted and Mohair Yarns—white or colors, in skeins, on spools, cones, or shuttle bobbins.

NOVELTY YARNS—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making Yarns only.

CENAPPED YARNS of all kinds. Doup Yarns. Harness Yarns. For Braids, etc.

BRISTOL, R. I.

George Campbell & Co.

Worsted Spinners.

Yarns, both French System and Bradford.

Knitting Yarns in all Grades and Mixes.
All Numbers to 60s.

21ST STREET AND WASHINGTON AVENUE, PHILADELPHIA.

MALCOLM MILLS CO.,

MANUFACTURERS OF

Novelty Yarns, Silk Noil Yarns, in Fast Colors AND White.

Mills, Frankford, Pa. Office, 229 CHESTNUT ST., PHILA.

(Continued from page 155.)

Skein:

20s soft	12 to 12½
19s "	12 to 12½
26s	12½
4s to 10s	10½ to 11
14s to 16s	11½ to 12
12/2	11 to 11½
14/2	11½ to 11¾
20/2	13
30/2	15
40/2	20 to 21
8/3 hard	10½
16/3 slack	12 to 12¼
16/2 slack	12 to 12¼
16/4 slack	12 to 12¼
12/3 slack	11½ to 11¾

Southern Cones (various qualities):

6s to 8s	11 to 11½
10s	11½ to 12½
12s	12 to 12½
14s	13 to 13½
16s	13½
20s	14
22s	14 to 14½
24s	14½ to 15½
26s	15 to 16
30s	16 to 16½

Shuttle Cops:

6s to 8s	11½
12s	12
16s	12 to 12½
26s	12½ to 13
40s	16 to 17

Mixed Colored Cones:

6s to 8s	13
10s	13 to 13½
12s	14
14s	14½
16s	15

Eastern Cops:

10s hosiery	12½ to 13
14s	13½ to 14
16s	14 to 14½
20s	15 to 15½
10s shuttle	12½ to 13
14s "	13 to 13½

Eastern skein ½c. above cops.

Eastern cones ½ to 1½c. above cops.

Universal wound cones ½c. extra.

Egyptian carded 5 to 6c. above white.

Combed yarn 5 to 6c. above carded.

Wool spun cotton yarn in better demand, but prices unchanged. We quote:

20s cut black cops	12¼ to 13
26s " "	15½ to 16
12s " "	12½
16s " "	12½

—The operatives in the cotton mills of North Carolina are, in many instances, saving a considerable amount of money from their earnings, some cases coming to the notice of the State authorities where operatives have saved sufficient money to buy a thousand dollars worth of stock in the factory in which they were employed.

--The hand-loom in Japan will produce about half as much as a power loom, but one person could attend to perhaps four or five of the latter at a time, and thus be able to turn out, say eight or ten times the product with a power-loom as compared with a hand-loom.

- Japanese rugs have deteriorated in quality to such a degree as to greatly check the foreign demand. The materials used are hemp, jute, cotton, wool, and silk, the two latter separately and in combination. They are made on upright hand-looms, which vary from 3 to 24 feet in width. The pattern is worked from the front.

SILK NOILS AND SILK NOIL YARNS
IN WHITE AND COLORS.
MOHAIR LOOPS, KNOTS, AND FANCY YARNS FOR DRESS GOODS AND CLOAKINGS.
A. T. SKERRY & CO., 47 LEONARD ST., NEW YORK.

John C. Meyer & Co., Manufacturers and Wholesalers of the Celebrated
MEYER SILKAKINE
Made in all sizes and colors.
Also manufacturers of high grade spool Threads and Silks. Samples and prices gladly furnished, free of charge, upon application.
87 SUMMER STREET, cor. Kingston, BOSTON,
Tel. 515 Oxford.

CHENEY BROTHERS,

SILK MANUFACTURERS.

ALL KINDS OF

Knitting Silks, Ribbons AND Piece Silks,

USED FOR TRIMMING KNIT GOODS.

TRAMS, ORGANZINES and SPUN SILKS, in the Hank, or on Spools or Cones, for Manufacturers' Use. Silk for Special Purposes Made to Order.

MILLS: South Manchester and Hartford, Conn.

SALESROOMS: 477, 479 and 481 Broome Street, NEW YORK.
929 Chestnut St., PHILADELPHIA.
79 Chauncy Street, BOSTON.
186 Franklin Street, CHICAGO.

WILLIAM RYLE & CO.,

DEALERS IN

Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Foreign and domestic

SPUN SILK YARNS AND NOILS

Importers of European and Asiatic Raw Silk.

54 Howard St., cor. Mercer St., - NEW YORK.

G. J. LITTLEWOOD & SONS, Ltd.

ALBION

DYE and BLEACH WORKS,

MANAYUNK, PA.

DYERS of Cotton, Cotton Yarns, Wool and Raw Stock Generally. **BLEACHERS** of Cotton and Cotton Yarn.

CITY OFFICE: 132 Chestnut Street. Telephone Connection,

PHILADELPHIA. MAIN OFFICE AT THE WORKS.

THE NOVELTY DYE WORKS,

WHITE & RUDY, Proprietors.

DYERS OF

WOOLEN, COTTON and MERINO HOSIERY YARNS,

Carpet Chain, Window Shade Cord, Drug Twine, any shade. Correspondence solicited.

Office, 212 Walnut Street, Second Floor, **CINCINNATI, OHIO**

PROVIDENCE DYE WORKS.

Dyers and Finishers,

COTTON YARNS, Suited for HOSIERY and WEAVING Cotton, Woolen and Worsted DRESS GOODS, Woolen and Worsted Mixed CASSIMERES and CLOAKINGS, also Woolen and Worsted Slubbing, COTTON YARN and WARP DYERS and BLEACHERS.

FIRTH & FOSTER CO.,

OFFICES: **Philadelphia, 546 Bourse Building.**
New York Office, Silk Exchange, Broadway and Broome St.
WORKS: **Taylor, Emerald and Adams St., Kensington, Philadelphia, Pa.**

R. GREENWOOD & BAULT,

GLOBE DYE AND BLEACH WORKS,

FRANKFORD, - PHILADELPHIA.

Specialists in Cotton Warps and Skein Dyeing.

HOME BLEACH AND DYE WORKS,

PETER B. McMANUS, Proprietor.

Dyers and Bleachers of Cotton Yarns,

PAWTUCKET, R. I.

Pawtucket Dyeing & Bleaching Co.,

BLEACHERS AND DYERS OF

COTTON YARNS AND STOCKINET.

OFFICE WITH **BLODGETT & ORSWELL CO., Manufacturers of Glazed Yarns,**
28 BAYLEY ST. PAWTUCKET, R. I.

COHOES DYE WORKS,

COHOES, N. Y.

Dyers of Raw Cotton, Wool and Knit Goods.

Satisfaction Guaranteed.
Capacity 10,000 lbs. per day. Prompt Deliveries.

AMERICAN YARN PRINTING WORKS.

JOHN FORREST
Printer of Cotton, Woolen, Silk and Worsted Yarns and Warps for Woven and Knit Goods. Bleaching of Cotton and Woolen Yarns a Specialty. **134 to 150 North 22d St., Philadelphia, Pa.**

D. R. KENYON & SON, Raritan, N. J.
Manufacturers of
Woolen Drying and Finishing Machinery,
INCLUDING
Kenyon's Patent Tentering and Drying Machines on Pipe System, Hot Air Dryers and Tentering Machines, Fulling Mills, Washers, Chinchilla and Whitney Machines, Whipping Machines, Cone Willows, Marsden & Blamire Lap Feed, Soaping Machines, Wringing Machines, Yorkshire Gigs, Dyeing Machines for Piece Goods, Friction Clutches, Jigs, double or single; Brush and Pumicing Machines for Worsteds, Dewing Machines.

FAST COLORS

For Wool, Woolen and Cotton Yarn and Piece Goods Dyeing, and for Calico Printing

ALIZARINE RED, PASTE AND POWDER.

Alizarine Blues, Oranges, Browns, Yellows, Maroon, Gray and Black.
Cœruleine, Galleine, Mythylene Grays.
Thionine Blues, Thionine Indigo, Solid Green and
PATENT BLUES (superseding Extracts of Indigo on account of fastness and color bloom) for Wool and Silk, Benzidine and Primuline Colors, Zinc Dust, Aniline Salts and Oil.

VICTOR KOECHL & CO. 122 HUDSON ST., NEW YORK.

SOLE AGENTS FOR

FARBWERKE, formerly MEISTER, LUCIUS & BRUENING, HOECHST o | M.; A. LEONHARDT & CO., Muehlheim o | M.

BRANCH OFFICES:

Boston, Mass., 138 Milk St.; Philadelphia, Pa., 39 N. Front St.; Providence, 45 S. Main St.

OAKES MANUFACTURING CO.,

Hematine, Extracts of Dyewoods, Chemicals.

New York. Boston. Philadelphia. Atlanta.

F. E. ATTEAUX & CO.,

174-176 Purchase St., BOSTON.

Sole Agents for the

AMERICAN COLOR AND CHEMICAL CO., ALBANY, N. Y., U. S. A.

ANILINE AND ALIZARINE COLORS.

Branches: New York, Chicago, Gloversville, N. Y., Toronto, Ont., Montreal, Que.

The STONE & WARE CO.,

IMPORTERS AND MANUFACTURERS

Colors, Dyestuffs and Chemicals.

145 Kinzie Street, CHICAGO. 157 Maiden Lane, NEW YORK, Zurich, SWITZEREAND. 105 Reed Street, MILWKUKEE.

ORIANNA BLEACH WORKS,

Bleachers of all kinds of Cotton Goods.
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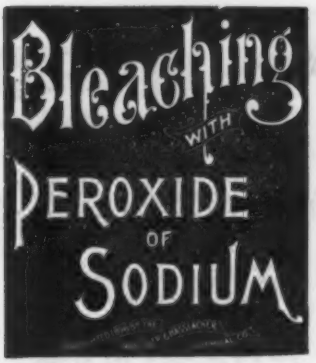

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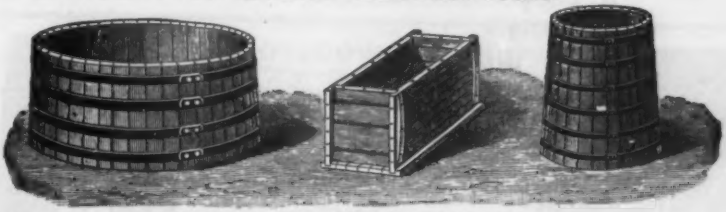

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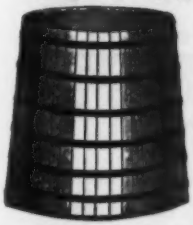

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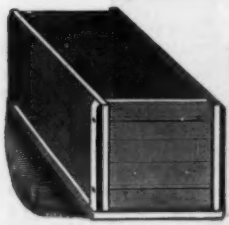

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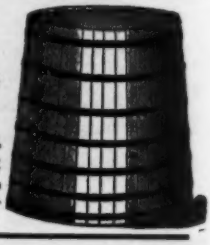

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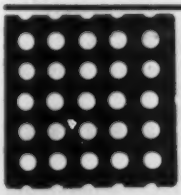

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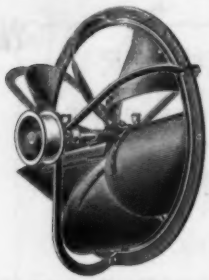

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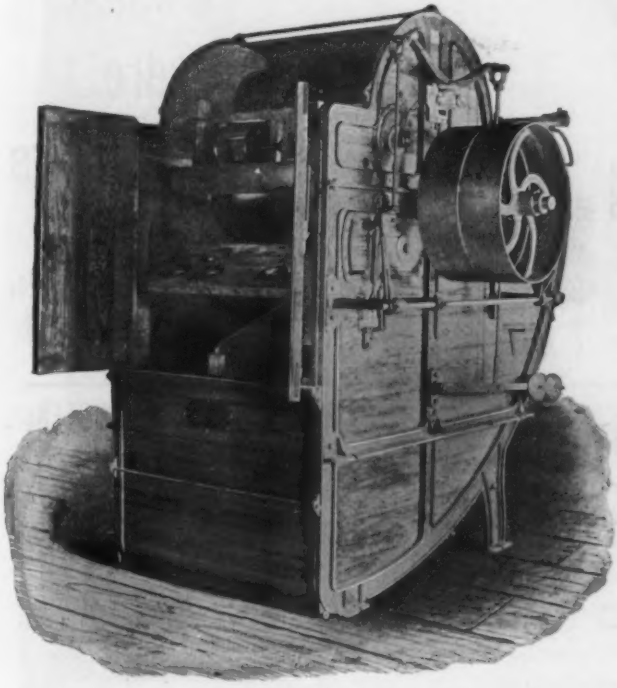

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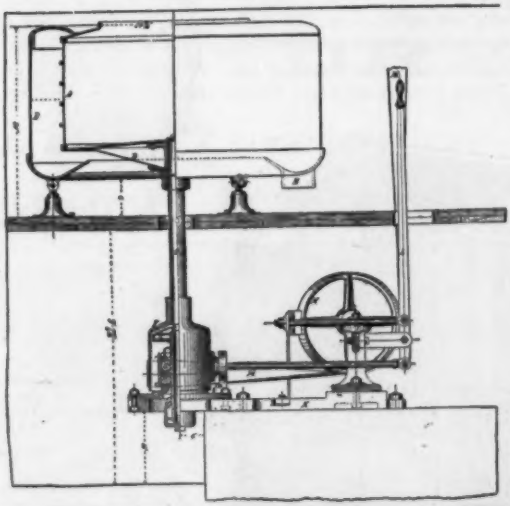

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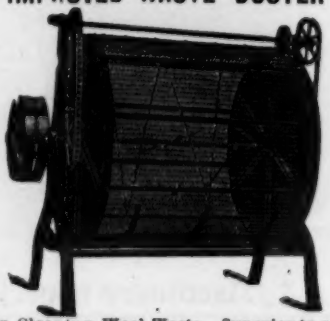

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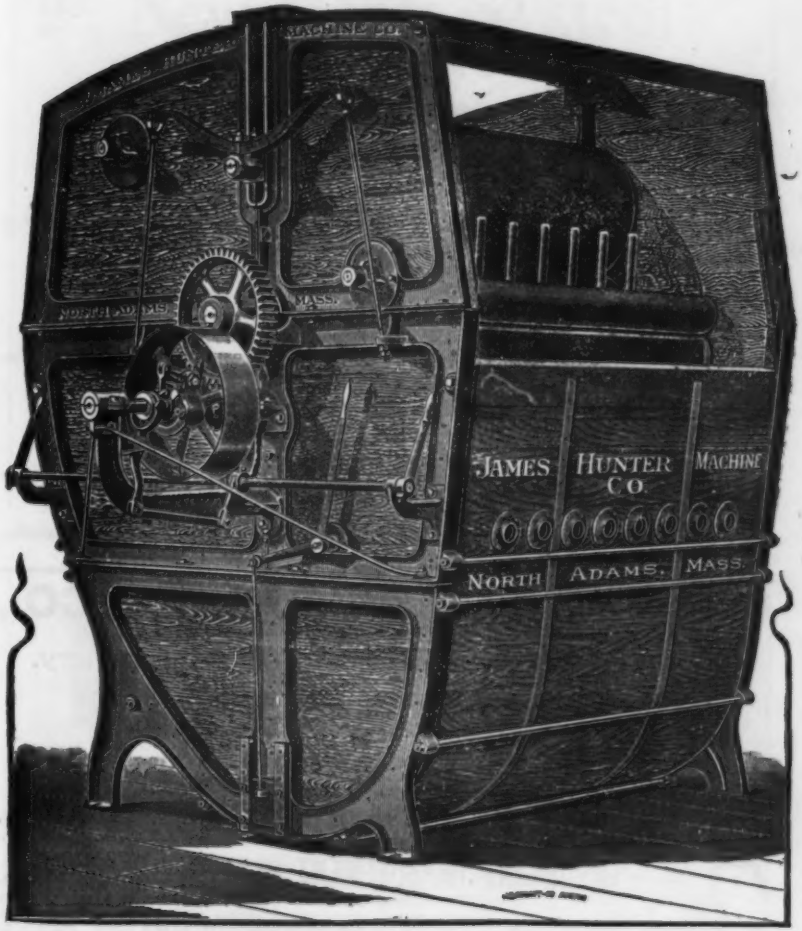

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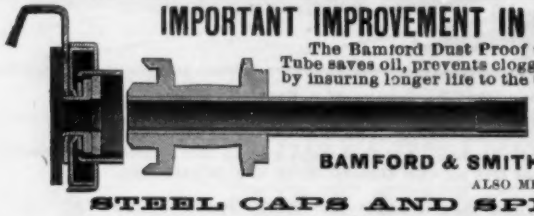

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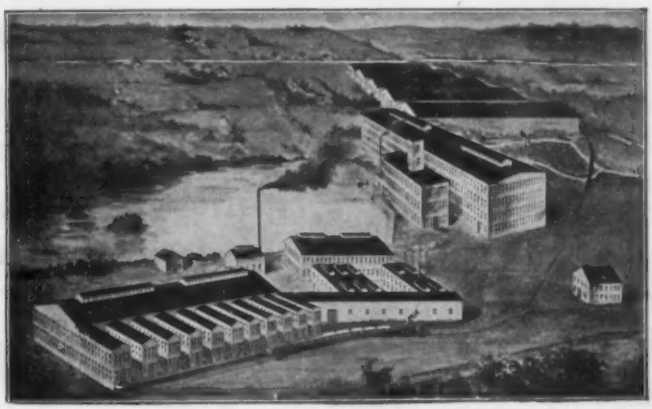

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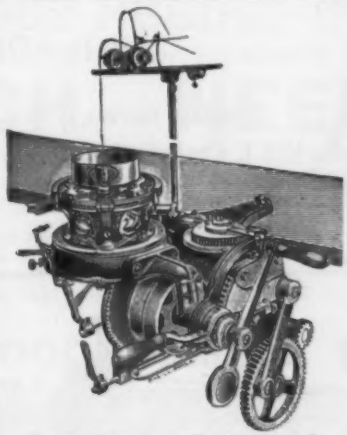

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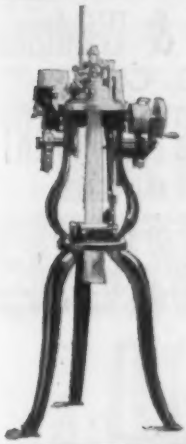

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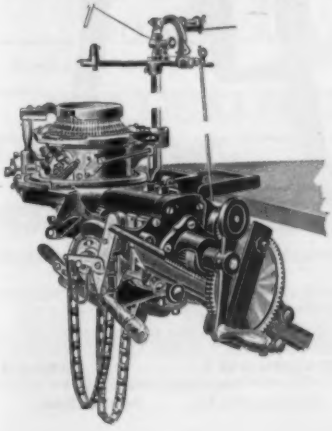

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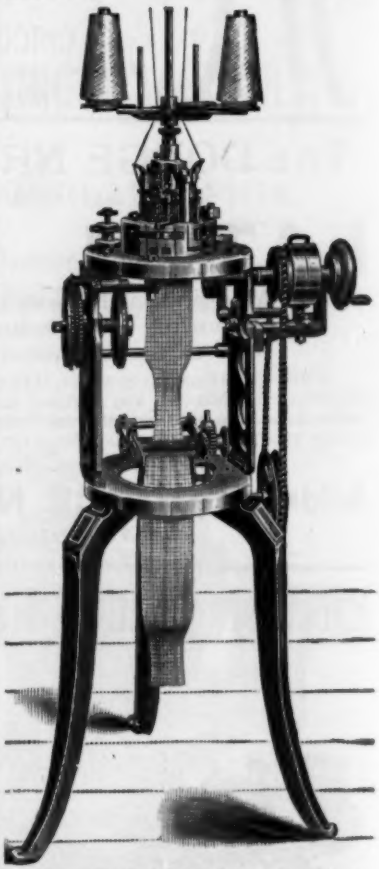

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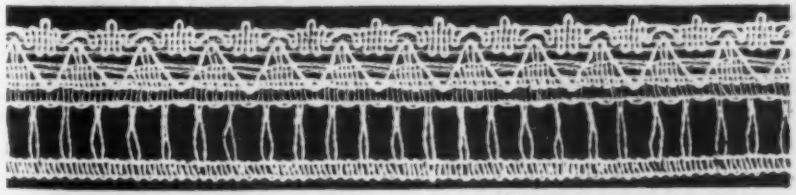

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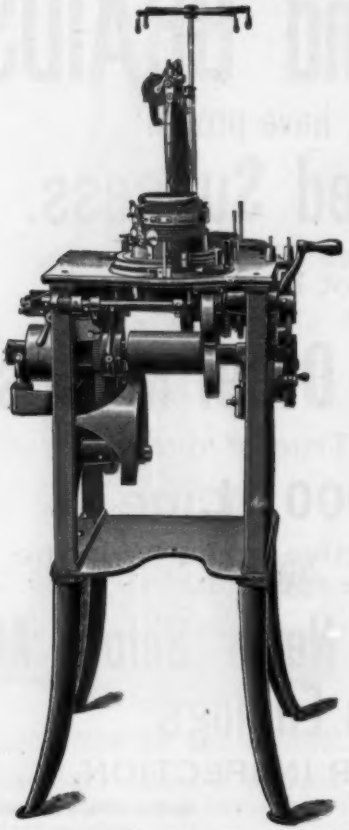

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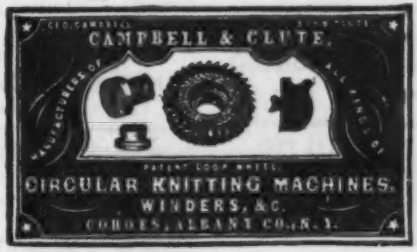

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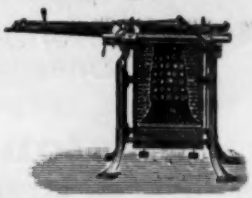

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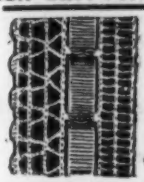

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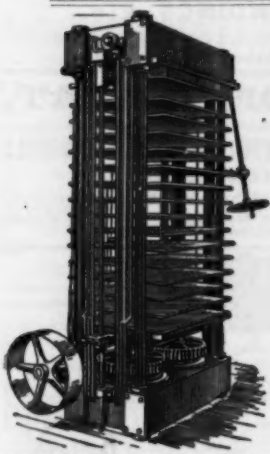

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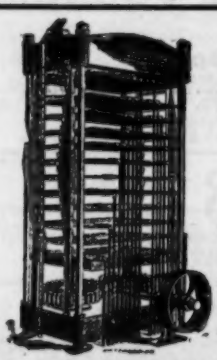

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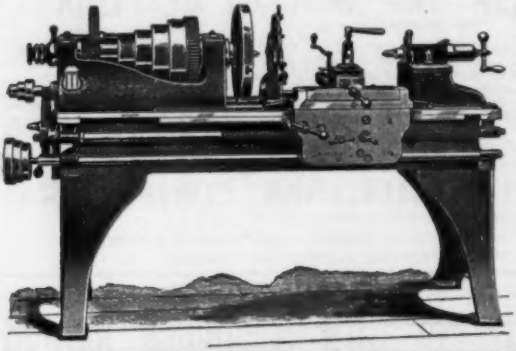

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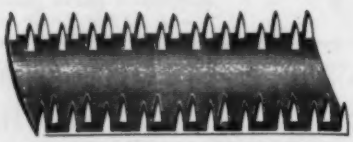

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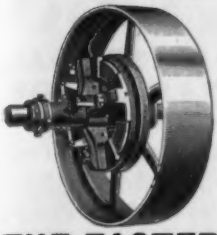

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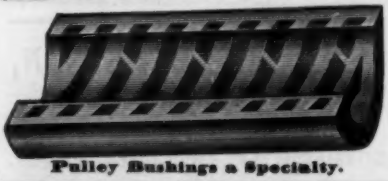

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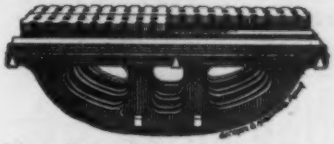

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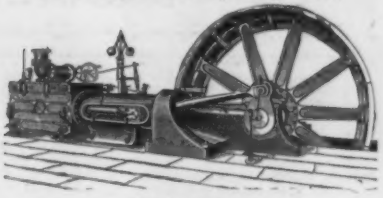

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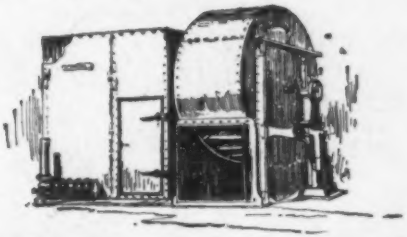

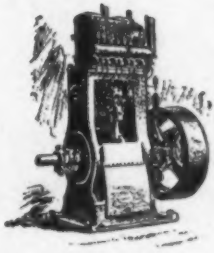

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